THE KARA SEA ROUTE (Illus.). *See pp.* 343–347.
CROSS-CHANNEL STEAMERS AND BULKHEADS. *See p.* 340.

SHIPBUILDING AND SHIPPING RECORD. *October* 21, 1915.
REGISTERED AT THE G.P.O. AS A NEWSPAPER.

SHIPBUILDING AND SHIPPING RECORD

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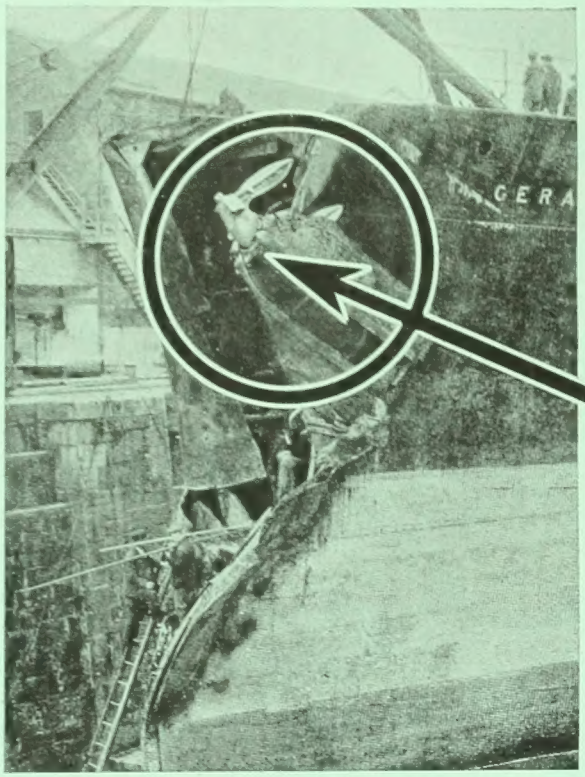

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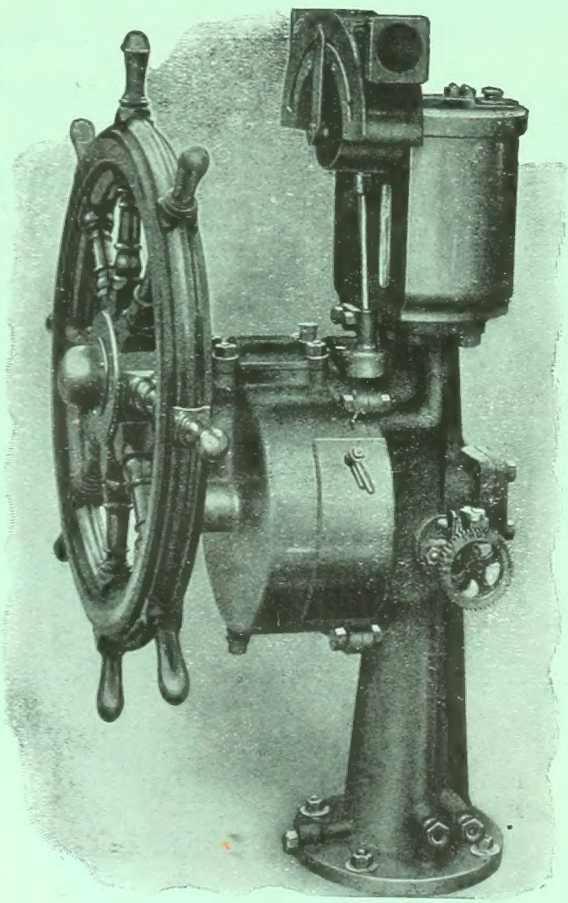

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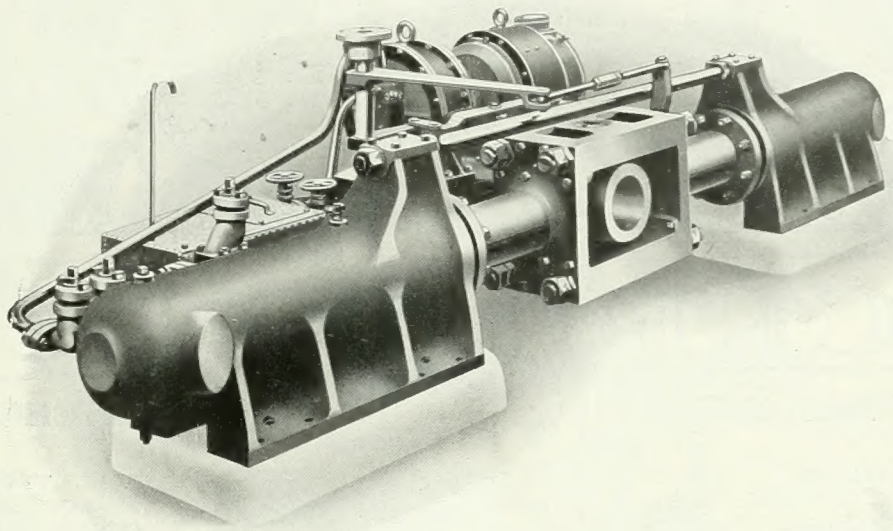

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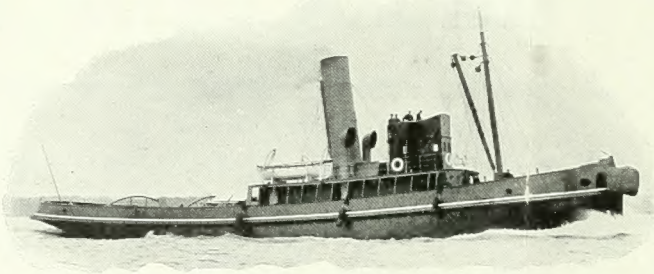

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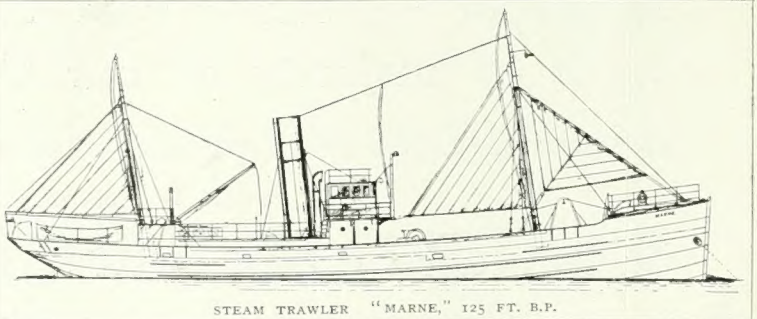

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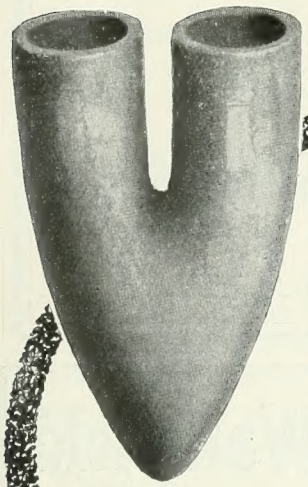

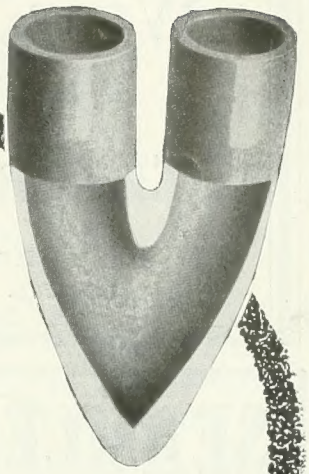

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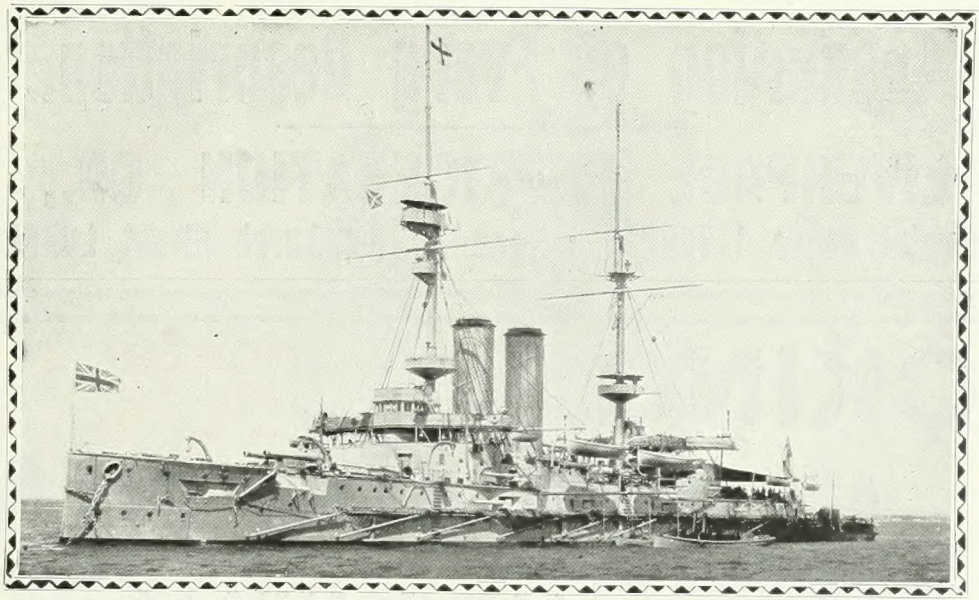

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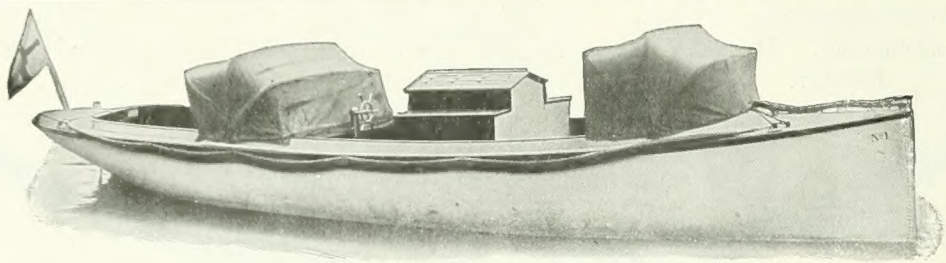

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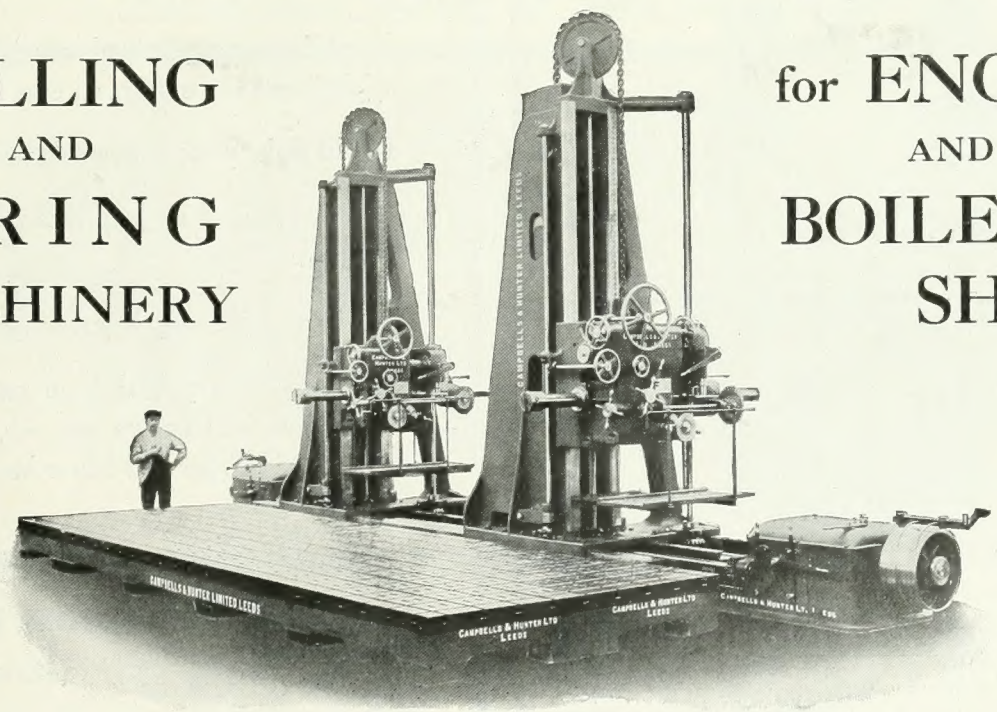

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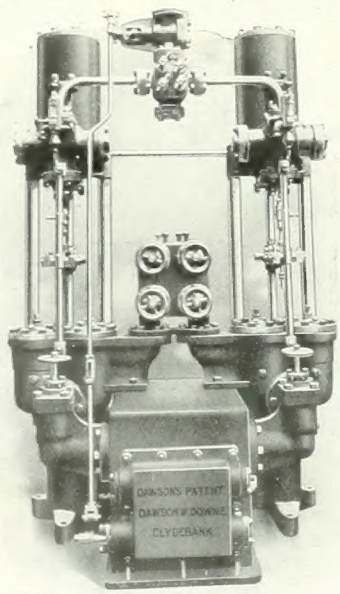

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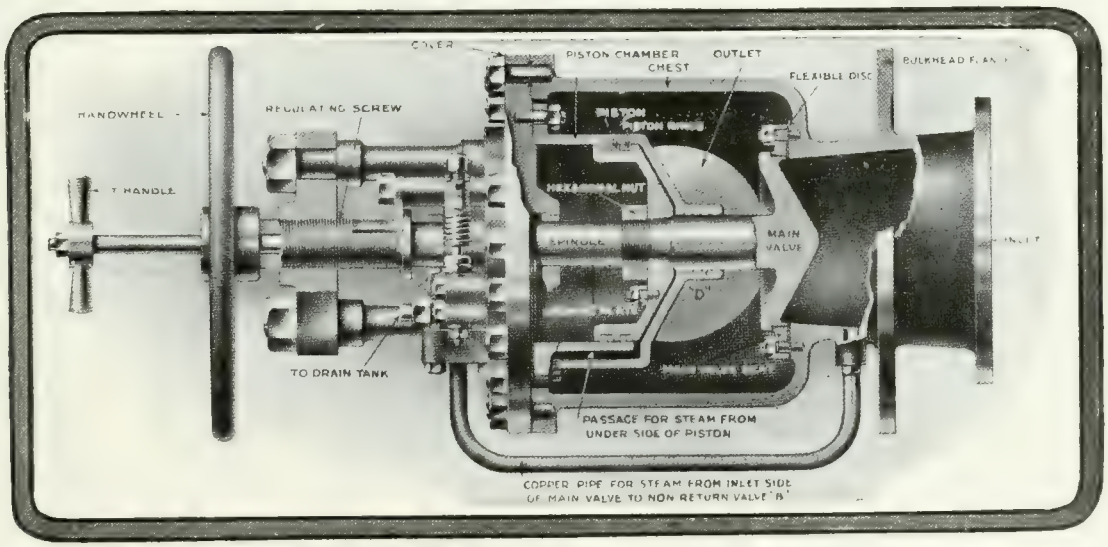

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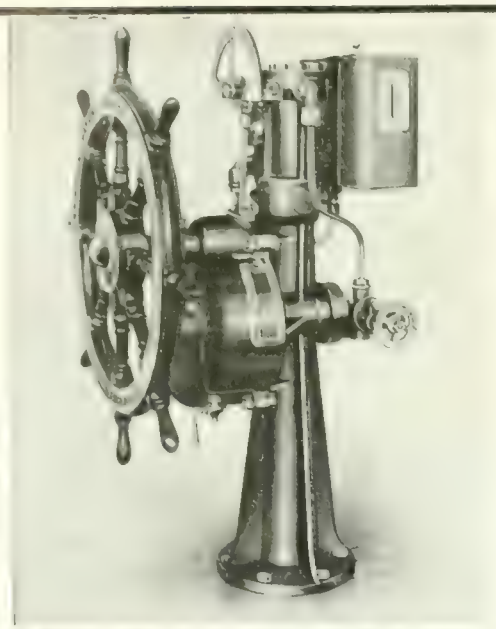

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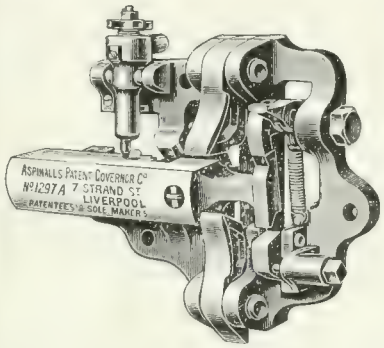

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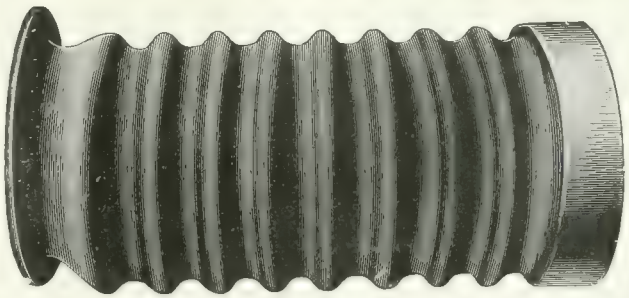

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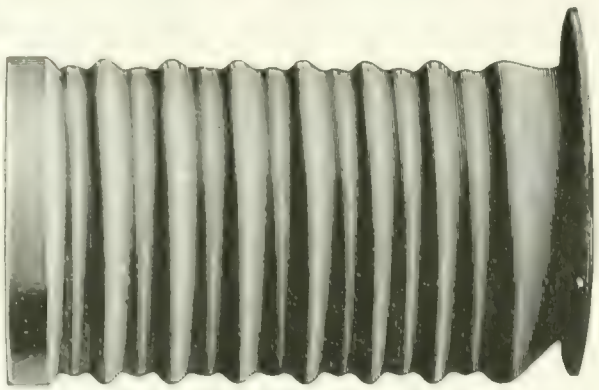

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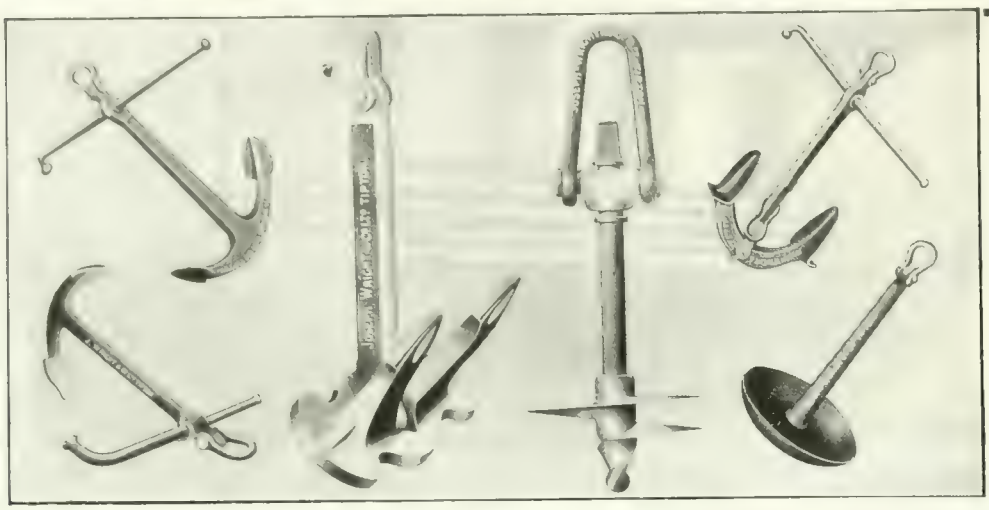

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Published Every Thursday at
QUEEN ANNE'S CHAMBERS, WESTMINSTER, LONDON, S.W.

Branch Offices—
Glasgow: 87, Union Street. Newcastle: Lloyd's Bank Chambers.
New York: Woolworth Building.

Telegraphic Address: "Recordship, London." Telephone No.: 2247 Victoria.

Subscription, including regular weekly and special issues, published from time to time, payable in advance and postage free:—

British Isles	£1 5s. 0d.
Elsewhere	£1 12s. 0d.
Single Copies	Sixpence.

The Editors will be glad to consider articles and paragraphs submitted by competent writers. All accepted contributions will be paid for. Whilst every care will be taken to return unsuitable articles, photographs and drawings (when a stamped addressed envelope is enclosed for that purpose) the Editors cannot hold themselves responsible for the safekeeping of unsolicited contributions.

Vol. VI. Thursday, October 21, 1915. No. 17.

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THE formation of new steamship lines, and the enlargement of shipyards, proceed apace in the United States, the evident hope of those responsible for these enterprises being that American interests will be in a position to take still further advantage of the maritime situation arising out of the war, as well as of trading developments when hostilities come to an end, although shipping authorities on this side of the Atlantic do not appear to be quite so sure that the results will accord with American anticipation. Meanwhile, Congress reassembles during the first week of December, and there is, naturally, a good deal of speculation with reference to President Wilson's intentions about the Ship Purchase Bill. A few months ago he was definitely committed to that measure, but, of late, it is understood that his views have undergone a considerable change, and that he is now inclined to favour a drastic revision of the navigation laws so as to relieve the legislative burdens that press so heavily upon shipowners, and to encourage private capital to invest in the industry. At all events, it is of some significance in this connection that the Inter-State Commerce Commission has been carrying out an investigation into the conditions that affect overseas shipping, which it is hoped, will be completed early next month. Any reversal of policy in the direction suggested would, of course, result in the modification or withdrawal of the Seamen's Act, of which there is, however, no sign at present. As a matter of fact, there is good reason to believe that, notwithstanding its defects, the new law is to be given a fair trial, yet its abandonment later on would not be in the least surprising. In the meantime, official interpretations of different clauses are now being given. Recently we stated that in the opinion of the United States Attorney-General, Section 14 of the measure does not apply to the vessels of countries that have ratified the International Convention on Safety of Life, while there is also some doubt about the payment to seamen on foreign ships of one-half the wages due to them at each American port which they may touch. Since then, the Secretary of Commerce has expressed the view that the language test clause means that if the officer can give the necessary orders in the native tongue of the crew, though he may not be able to converse freely in the language, it will be enough. At this rate, there will soon not be much of the original Act left.

American Shipping.

A very encouraging measure of success is attending the efforts being made in this country to establish the industry of palm kernel crushing, which prior to the war was monopolised by Germany. By taking German manufactured goods out to the west coast of Africa and bringing back cargoes of palm kernels, ivory, rubber, hides, copra, cocoa and ground nuts, Germany was able to support a line of steamers to the West African ports and back without meeting with competition from Britain. Now, however, that the incomparable British Navy has cleared the seas of German shipping an opportunity has been created for us to secure what is our natural trade, for the great proportion of the palm kernels are from British African possessions. Regular arrivals are being recorded at Hull, and also at Liverpool, of large cargoes of palm kernels in British bottoms from the west coast of Africa, and a start has been made at firmly and permanently establishing the industry in this country. The palm kernels are crushed for the extraction of oil for soap and candle making and for fat for edible and domestic purposes, and the residue is manufactured into meal or oilcake for cattle feeding purposes.

West African Trade.

According to all accounts the underwriting settlement both for last year and this is extraordinarily light up to date. This, following on a very successful account in 1913, is, to the uninitiate, encouraging, but those who are in a position to judge, know that a heavy balance is outstanding, and must be taken into account when the figures at present available are under consideration. Owners with vessels that have incurred averages are putting off dry-docking for repairs to the last possible moment, and steamers are now being run with unrepaired damage on board, or at the best, a temporary repair to enable the vessel to obtain a certificate of seaworthiness. There is no help for this; the need for tonnage is so urgent and the difficulty of getting repairs done so great, that a vessel would be laid up for, perhaps, months getting the smallest repairs attended to. This, then, accounts for the light settlement experienced on 1914 and 1915 up to the present, but time will tell its tale and underwriters are under no delusion as to the repair bills they will be asked to settle some time within the coming 24 months.

Underwriting Settlements.

Owners who are contemplating an installation of fire-extinguishing apparatus on their steamers should bear in mind the fact that underwriters are prepared to grant a return of premium if vessels are fitted with an approved pattern of fire extinguisher. The return is collectable at the expiration of the risk and is conditional on no claim for fire attaching to the policy. The return is not large in amount, but a few years' immunity from fire would enable an owner to pay for his extinguisher by the returns collected on its behalf. Underwriters are not philanthropists. It is not their intention to present an owner with a fire extinguishing apparatus out of kindness of heart. They know that a good installation safeguards their interests and saves many heavy claims, while

Fire Extinguishers and Insurance.

few interests are damaged by the gas used in these appliances as much as they would be by the injection of steam or water. A point to be borne in mind in this connection is that the gas method is useless if water and steam have been used before the gas is injected owing to the quick absorption of carbonic acid gas by moisture.

The Kara Sea Route.

On pages 343-347 we describe and illustrate some of the leading features connected with the Kara Sea route which Mr. Jonas Lied, Director of the Siberian Steamship, Manufacturing & Trading Company, Ltd., has so successfully opened and maintained during the last three years. In doing so, he has demonstrated the commercial possibilities of a scheme upon which he has worked for a great many years and on which he has brought his vast and almost unrivalled knowledge of Siberia to bear. The route was opened out in 1913 by one vessel which reached the Yenisei. The next year, two steamers and a fleet of river boats for use out there were despatched, and this year two steamers went out in ballast, loaded in the Obi and Yenisei rivers, and returned with £350,000 worth of goods. Next year Mr. Lied proposes to take out between 20 and 30 steamers. He considers it advisable to make only one journey a year, chartering for that purpose as many steamers as the circumstances justify. There is one word of warning, however, to be uttered against any one embarking on the scheme lightly. While there is ample room for others—and, indeed, the more who go there the better should the facilities become—it is not a journey to be undertaken without the fullest knowledge of the dangers of navigation and also of the trading conditions out there. So far it has been possible to get insurance companies to accept the risk, and with each year's immunity from accidents the premium has decreased. Any foolhardy venturer will not only bring upon himself disaster which he will richly deserve, but he will also bring discredit on the route, send up insurance premiums to a prohibitive rate, and generally spoil the chance of firmly establishing what promises to be a remunerative outlet for shipping enterprise.

Panama Canal Problems.

Shipowners, both British and foreign, whose vessels run to the west coast of the Americas, the Far East, and Australasia, via Panama, have every reason to be seriously concerned, as well as alarmed, about the stoppage of traffic through the Canal, the re-opening of which will probably not take place until early next year. It is certainly small consolation to be told that the present activity of the slides will, in the opinion of the engineers, be for the ultimate good of the waterway, seeing that several years must necessarily elapse before the surrounding hills are levelled down, and that, in the meantime, it is likely that the present block will be repeated many times. As far as can be ascertained, over 100 vessels are at present held up at both ends of the route, two of them, the former Pacific Mail boats *Korea* and *Siberia*, being, in fact, delayed at Balboa on passage to London, in order to take up service for their new owners, the Atlantic Transport Line. Naturally, shipping people are undecided as to the course which they should adopt—wait in the hope of an earlier resumption of traffic than is generally anticipated, or send their vessels by way of the Straits of Magellan, the Cape of Good Hope, or Suez. Few, unless engaged in the United States coastal trade, will, we should think, tranship their goods by the Panama Railway, for this involves the provision of tonnage at each terminal, and, in existing circumstances, there cannot be many vessels available for the purpose. Apart from the extra cost of deviation, in some cases from £5,000 to £6,000, the holding-up of ships, in view of the high freights ruling, must be a very serious matter, especially as there does not seem to be any prospect of compensation from the Canal Administration. It is, in fact, asserted that, with rates at their present level, the average daily cost of keeping a ship at either terminal cannot be far short of £300. There is, in addition, the disarrangement of sailing schedules and the consequent withdrawal of cargoes, while it has also to be remembered that the climatic conditions in the Canal zone are extremely hard on many classes of highly valuable freight.

Strikes and Demurrage.

We live in such stirring times that the Dublin Dock strike seems like ancient history. Yet the incidents of that occurrence continue to occupy the attention of the Irish Courts, and a demurrage action arising out of it has only now been decided. The *Twilight* arrived in Dublin on September 11, 1913, with a cargo of grain. Her days for unloading expired on September 24, but as a matter of fact, the cargo was not completely discharged until December 20. Her owners claimed demurrage for 87 days at the rate of £51 13s. 4d. per day. In the charter party there was a strike clause which laid down that "if the cargo cannot be discharged by reason of a strike or lock-out of any class of workmen essential to the discharge of the cargo, the days for discharge shall not count during the continuance of such strike or lock-out." The point which the owners of the *Twilight* took was that during the period from September 12 to 24 labourers were available to discharge the ship, and therefore the strike clause did not operate. On the other hand, the cargo-owners contended that a strike had actually occurred on the ship and that it was impossible to get the labour necessary to complete the discharge. Mr. Justice Boyd gave judgment against the shipowners. The defendants, he held, could not have obtained suitable men to complete the discharge. The strike was not a result of their action but of a conspiracy which created disruption in the whole trade of Dublin.

An Extraordinary Action.

An action of particular interest to the coal trade was before Judge Fossett Lock at the Hull County Court the other day, in which the plaintiffs, Ludke & Steel, coal exporters, of Newcastle-on-Tyne, claimed £300 as damages arising out of an agreement with the owners of the ss. *Alice Krohn* for the chartering of that vessel to carry coal to Assens, option Tuborg, in Denmark, to load last June 29. When the case came on, counsel for plaintiffs said that he had accepted the paying into court of 1s. and costs by the defendants in settlement. The defendants, however, made an application that the costs thus incurred by the defendants should be on the lower scale B, and detailed the circumstances leading up to the action. From this it appears that in the charter party there was a clause reading: "This charter is subject to the licence being granted by the British Government," but there was some delay in securing the licence and his clients thought it was very doubtful whether a licence would be obtained and they chartered the vessel elsewhere. Subsequently, however, the plaintiffs were granted the licence, and they then remonstrated with the defendants for not carrying out their charter party. The plaintiffs then chartered another vessel to carry the coals at less freight with the result that they were £72 10s. in pocket through the difference in freight. According to the defendants' contention it thus appeared that the plaintiffs were bringing an action for breach of contract through which they had actually saved money. His honour gave a decision that the defendants should pay the usual scale of costs as they had failed to carry out their charter party.

Men and Munitions Act.

The dislike of the Munitions Act which many workmen are showing is assumed in some quarters to be due to the average Briton's distaste for discipline. To some extent it probably is. Careful observers of the situation will, however, incline to the view that its root cause is the aggressiveness of the trade unions, which for some years have been given rather much latitude by Governments. What is happening under the Munitions Act is not

at all obscure. There are in the United Kingdom more jobs than there are men, and accordingly the militant trade unionist is in exactly the position he occupies in peace time when the demand or his services is abnormal. In every pre-war spell of great activity he has extracted the utmost in wages and "conditions" from employers, and he does not see why he should not do so now, seeing that in other days he had Government approval for what he now proposes to do. The State's changed views on the rights of Labour are expressed in the Munitions Act—as many of them, at any rate, as the higher officials of Trade Unionism deemed it advisable to allow it to express. And the men, as was to be expected, do not like them. Why? Simply because the Act in effect forbids them to do all the unreasonable and unfair things pre-war law allowed them to do to employers when trade was brisk. The dissatisfaction is not due to any fear that their rights are being filched from them. They know that none of their rules, practices and customs is in jeopardy. They dislike the Act and its discipline simply because it prevents them from taking the last farthing out of whatever job they are doing, and daring employers to resist them in any way. It may be some consolation to the careful observer to reflect that politicians will come out of this business with clearer ideas as to what modern Trade Unionism really is than they took into it.

Mercantile Shipbuilding's Progress.

Because more skilled men are now available in places it is assumed that better progress will shortly be possible with the mercantile shipbuilding which is in hand. With labour freer to take up other work than that which has for some time chiefly occupied it, a good deal should be done with vessels on the stocks or alongside fitting out. Much will depend, however, on the view taken by the men who, although they did not go the length of refusing civil work when they had no other, might consider themselves to be under no obligation to speed it up. And as most readers are aware, it is imperative that there should be as little delay with mercantile work as there is with naval work, provided the men are available. When we proceed to consider the case of new work—vessels, that is to say, which have not yet been laid down—a new consideration crops up. One of the causes of the slow progress of mercantile shipbuilding has been the irregular delivery of materials. Presumably, if more shipyard hands are available for civil work more steel will also be available. But it need not be ignored that the requirements of British shipbuilders are not the only ones awaiting fulfilment. In pre-war days, for example, Japanese shipbuilders were large importers of British steel. Their yards are full of work now, and material is dear and difficult to get. The shipyards of other foreign countries whose owners in peace time got most of their material from us are also full of work which is making slow progress. The conclusion which the average man will draw from these facts is, we think, that if our reviving mercantile industry gets the steel it requires it will have to pay heavily for it.

The Mid Area Constant.

When a new ship is contemplated it is necessary to arrive at an estimate of the horse-power which will be required for a certain definite speed. This can be done by several methods. A model might be run in an experimental tank; an estimate might be made from published results of experiments on models of the same proportions and fullness; or, by choosing a constant of performance achieved in actual trials by some similar type of ship, the horse-power might be found. Up till comparatively recently the last method indicated was that generally adopted, and in many yards it is still that employed. There are two constants which have been in general use, viz., the displacement constant, which takes into account displacement, speed and power; and the mid-section constant, which is based on the area of the mid-section, the speed and the power. The former is based on sounder principles than the latter since the wetted surface of vessels is approximately proportional to the displacement to the $\frac{2}{3}$rd power. The mid-section constant, on the other hand, assumes that the power is directly proportional to the area of the mid section, and this is certainly not the case. One point which has been clearly demonstrated by tank experiments is that the fuller the mid-section is made, and the finer the ends for a given displacement, the less will be the resistance. With a fine mid-section coefficient, and a given block coefficient, the prismatic coefficient must be full, and residuary resistance increases considerably with increase in prismatic coefficient. The idea that a fine mid-section was necessary for a good performance was commonly held, and no doubt this was due to the teachings of Scott Russell, who said that "to give a ship length and reduce the area of the largest section to a minimum is the first step to securing a fast and economical ship." We were of the opinion that the mid-section constant had fallen into disuse, but only the other day some data came under our observation in which this was used to indicate the performance. It may be that for ships exactly similar in type this constant is useful, but the displacement constant fulfils the same functions and is more reliable.

Current Meters.

There is now being used in the Panama Canal zone a new form of current meter to determine the currents set up in various parts of the Canal, as by the inflow of rivers into the lakes, the operation of the spillways, and the operations during lockages. The essential difference between this instrument and those previously in use on the Canal zone is the direction indicator. Within the central part of the submerged meter (which indicates the velocity of the current by the revolutions of a propeller) is a compass, the needle of which is free to assume the magnetic meridian when released through an electric current. An indicator, in the equipment which is kept above water, is operated by clockwork, which, in turn, is in synchronous connection with a clock attached to the true compass within the meter. Before the meter is submerged the compass needle and the needle of the indicator are set at zero on the azimuth scale. When the compass needle is released it swings to north, operating thereby the clockwork, which swings the indicator needle through the same arc. The direction-current meter will measure accurately currents running between ·2 ft. and 30 ft. per sec.; that is, from $\frac{1}{8}$ to 17·8 knots.

Marine Engineers and Coal.

In the course of his paper on "Solid Fuel from the Technical and Commercial Standpoint," which was read before the Institute of Marine Engineers, Mr. A. E. Battle remarked that it is a well-known fact that notwithstanding the developments of the gas plant and oil engine, steam is still the main power producer and, judging from the improvements in steam generators and the steam turbine, it will still continue to be so. Side by side with the vast and wonderful improvements it is not surprising that one of the greatest coal consumers of the world, namely, the marine engineer, should be content to operate without some scientific control as to purchase and consumption. It is surprising that at least a snap analysis apparatus to test the funnel gases is not fitted even to the well-equipped liner, for it is an established fact that operating without some scientific control is open to the inroads of losses which are heavy and difficult to detect. On shore, the purchase of coal on its heat value is attracting considerable attention, and it is no longer to be regarded as an experiment. The author further remarked that no owner wishes to pay coal prices for sea water or paving stones, and it is probable that many a chief engineer would have a possible explanation for high coal consumption if the suggested course were adopted.

Owners' defaults and local conditions govern the coal supply.

British thermal units per ton
Boil by reducing the matter down to ——————————
Coal in pence per ton

It is proposed to take the number of British thermal units per ld. as a basis of calculation. We refer on page 341 at greater length, to this paper.

LEGAL DEFENCE OF COMPULSORY PILOTAGE.

A STRICT description of what is a compulsory pilotage area has been adopted by the House of Lords in allowing the appeal from the decision of the Court of Session in the case of the Steamship *Beechgrove* Company, Ltd., *v.* the Aktieselskabet *Fjord*, of Kristiania. The relief granted to a shipowner by the legal defence of compulsory pilotage is only available in respect of collisions actually taking place within specifically defined waters. That may at first sight seem a simple affirmation of the law, without much novelty. Let us apply it to the Clyde and we shall see the direction in which it carries us.

Take the case under review. The *Blaenavon* and the *Fjord* were in collision off Greenock at a spot some 4 miles west of the Newark-Cardross line, where the River Clyde ends and the Firth of Clyde begins. Penalties are imposed for navigating the river without a pilot. None are imposed for so navigating the Firth. By the by-laws under a local statute there are two sets of pilot licences. One licence is from Glasgow to Greenock, the other for the Firth down to Little Cumbrae. The inward river pilot is taken on at Greenock, and one of the by-laws lays down that pilots on board ship should have the sole charge of the vessel. The *Fjord* had taken on her pilot for the inward voyage when the collision occurred. Were her owners entitled to advance the legal defence of compulsory pilotage in a collision action? The matter does not now seem quite so simple as it was at first sight.

In the Court of Session the majority of the judges adopted the view that in such circumstances the legal defence of compulsory pilotage was admissible for the owners of the *Fjord*. They framed their argument on these lines. The owners were compelled to take a pilot on board off Greenock, to place him in charge of their vessel up to the harbour of Glasgow and to pay for his services from Greenock to Glasgow. Accordingly the relationship of master and servant did not exist on any part of the inward voyage between the owners and the pilot.

This reasoning did not appeal to the House of Lords. The Lord Chancellor repudiated the idea that by-laws could make pilotage "compulsory by law" throughout an area. So far as the statute was concerned, there could be no exemption from liability by virtue of its provisions unless the accident was actually within the defined and fixed area within which pilotage was compulsory. Thus his lordship declared that no legal compulsion was placed upon a master if the vessel was not surrendered into the pilot's hands before the actual boundaries of the river were reached. In his view the presence of the pilot did not make the pilotage outside the area of the river compulsory within the meaning either of the Act of Parliament or the common law. In other words, as Lord Atkinson remarked, the pilot did not carry compulsion with him outside the fixed and defined area. All the other law lords concurred in this line of argument. Accordingly, compulsory pilotage does not, in fact, exist off Greenock, and the legal defence of compulsory pilotage is not available to the owners of the *Fjord*. That is the final decision.

This judgment, both in its immediate and wider aspects would possess even much greater importance than it does, if the Pilotage Act of 1913 did not abolish the legal defence of compulsory pilotage as from January, 1918. The decision of the House of Lords will be fully operative in regard to similar cases arising in the intervening period. Then it will become obsolete.

CHANNEL STEAMER SUBDIVISION.

IN applying to new designs the regulations as set down in the first report of the Bulkheads Committee, considerable difficulty has been experienced in arriving at arrangements of machinery spaces, to fulfil the requirements of the builders, the owners, and the report. It appears as if even greater difficulty will be experienced in complying with the standards of subdivision set forth in the second report. Channel steamers, as a rule, are not of great depth, and the freeboard ratio in the majority of cases will be small. As this is the dominating factor in the determination of the floodable length, the result is, that whereas in large vessels a floodable length of from 25 to 35 per cent. of the ship's length may be obtained amidships, in channel steamers it may be only about half that value. The subdivision factor of ·5 which has been set, gives, accordingly, very small lengths for engine and boiler rooms. We are led to believe that certain cross-channel steamers have been built which would comply with the new standards, but there are many afloat which are anything but safe two-compartment ships. Especially in fast high-powered ships will the greatest difficulty be experienced, but possibly the ingenuity of engineers will be equal to the necessity of getting great power into small engine rooms. It may be that the adoption of high-speed turbines and gearing will help in this direction. Forward and aft of machinery spaces the difficulties are not so great, although there, also, the new regulations will mean the cutting up of spaces which have hitherto been kept as reasonably spacious as circumstances would allow, for the accommodation of passengers. It must be admitted that there was much need for some regulations regarding the subdivision of channel steamers, as the lack of authoritative supervision of the design of these vessels has permitted the construction of several whose ability to float in a damaged condition is negligible.

SHAFT BRACKETS AND BOSSINGS.

ONE of the most instructive points which has been elucidated by experiments in various basins is that dealing with the resistance of bossings and the influence of direction of rotation in the performances of ships. A few years ago it was considered that the latter had little or no effect on performance, and that it was immaterial whether screws were inward or outward turning. Further experiment and experience has demonstrated that this must be qualified, and that in certain cases the direction of rotation has a great influence on performance.

This was first discovered during certain experiments made at the Government tank at Haslar. The resistances of certain models had been determined first of all with no bossings or shaft brackets fitted, then with shaft brackets, as is usual in warship work. Further, bossings were fitted set at an angle normal to the shell, and finally bossings placed horizontally were tried. It was found that whilst shaft brackets and bossings placed normal to the shell increased the resistance by a relatively small amount, horizontal bossings were very resistful. This result was unexpected, but when the screws were placed behind the models and made to revolve at the proper rate of revolutions still more unexpected features were observed. It was found that although high resistance was associated with horizontal bossings, the screws worked more advantageously behind these than when behind either shaft brackets or bossings sloped normal to the shell. This was due to the high wake value which existed. Shortly after these experiments had been made a most exhaustive series were carried out in a German tank on a model of the *Kaiser Wilhelm der Grosse*. In this series the experiments dealt only with the resistances of various types of brackets and bossings, and the propeller action was left out of account. The same peculiarities were again discovered. The effective horse-power at a speed of 23 knots without brackets or bossings was found to be 16,374, but this was increased to 19,170 when horizontal

bossings were fitted. That this was not due to additional frictional resistance due to greater wetted surface was shown by the following figures. The frictional effective horse-power with no bossings was 10,127 and the wave making 6,247, whilst with bossings the frictional horse-power was 10,462 and the wave-making 8,698. The total resistance was thus increased by over 17 per cent., and the wave-making by almost 40 per cent.

A few years ago Prof. Sadler, of Michigan University, made some experiments on the same subject. From these the same nature of results was obtained, horizontal bossings being found to increase the resistance considerably.

The most exhaustive series of experiments yet undertaken on bossings, and direction of rotation of screws, have been made by Mr. W. J. Luke, of Clydebank, the results of which were given in a paper to the Institution of Naval Architects in 1910. These were made on a model 203 in. in length, 30 in. in breadth and 9 in. in draught, the block co-efficient being ·65. The model was run, firstly, with no appendages, and afterwards with bossings set at various angles of inclination. Five angles of bossing were experimented upon, viz., horizontal, 22½, 45, 67½ and 90 deg. to the horizontal. At a speed of advance corresponding to 18 knots for a 400-ft. ship, and treating the resistance of the model without bossings as unity, the resistances observed were as follows :—

Resistance of model without bossing	1·0
,, with horizontal bossing	1·10
,, ,, bossing set at 22½	1·04
,, ,, ,, 45°	1·03
,, ,, ,, 67½°	1·05
,, ,, ,, 90°	1·11

Thus, again, horizontal webs were found to be resistful, as also were the vertical, those sloped at an angle normal to the shell gave the least resistance.

From the above results it might be reasoned that the fitting of flat bossings should be avoided, but this is not necessarily so, owing to the high hull efficiency values which are associated with outward turning screws and horizontal bossings. When model propellers were made to revolve behind the above model with the various bossings the wake and thrust deduction values were observed. In the following table the hull efficiency values thus obtained are associated with the resistances given above :—

Angle of bossing.	R.	Screws. Outward turning. H.E.	Screws. Outward turning. R. H.E.	Screws. Inward turning. H.E.	Screws. Inward turning. R. H.E.
0°	1·10	1·10	1·0	·94	1·17
22½°	1·04	1·03	1·01	·99	1·05
45°	1·03	·97	1·06	1·03	1·00
67½°	1·05	·91	1·15	1·06	·99
90°	1·11	·84	1·32	1·09	1·02

From this it is clear, and actual experience has shown it to be so, that outward-turning screws must be associated with flat bossings, or with those set at angles up to about 30 deg. Inward-turning propellers must not be fitted in vessels with bossings unless these are set at a very steep angle, which they never are in actual practice.

SOLID FUEL FROM THE TECHNICAL AND COMMERCIAL STANDPOINT.

THE paper entitled "Solid Fuel from the Technical and Commercial Standpoint" which was contributed to the Institute of Marine Engineers proceedings by Mr. A. E. Battle, Member of Council, provides some interesting reading on the subject of fuel considerations as they apply to marine engineering practice. The author pointed out that to those who go down to the sea in ships, that is to say in engine rooms, is given the special privilege of a weird and wide knowledge of the world's coal varieties. Not as a rule the best of their varieties either, and in many cases their quality is by no means improved during its transit from the coal beds to the ship's bunker. The bulk of the coal used for marine purposes is of the lignite or bituminous class. The specific gravity of the average coal runs from 1·27 to 1·45. The storage capacity depends to a great extent upon the specific gravity. The following data, according to Bream, is the storage capacity of the different coals as per Admiralty data :—

One ton of Welsh coal, 40 to 42 cubic ft.
One ton of Newcastle coal, 45 cubic ft.
One ton of Scots coal, 47 to 50 cubic ft.

The physical properties of coal can be ranged under the heads of density, cohesion and calorific value. The combustible substances of the coal have been stated to be carbon, hydrogen and the oxygen it contains, and when combustion is complete the flue gases should be composed of carbon dioxide, water vapour, sulphur dioxide, together with nitrogen and free oxygen, the latter being due to an excessive air supply. In general terms practical combustion is a compromise between heat losses due to incomplete combustion and losses due to heat units being carried away by the excesses of the air supplied. This subject is so well explained in practically all engineering text books that it would be waste of time and, indeed, there is no need to dwell upon it here. A perusal of the following table would no doubt prove interesting as clearly showing the varying loss under conditions due to the formation of CO, and also to an excessive air supply :—

Table I.—Carbonic Acid Produced by Excessive Firing.

Time.	Pounds of coal thrown on grate.	Carbonic acid in chimney gases.	Carbon monoxide in chimney gases.	Ratio of carbon monoxide to total carbon.	Pounds of air per pound of coal.	Pounds of coal burned each half-hour.	Ratio of loss by carbon monoxide to full power of coal.
H. M.	lb.	CO_2	% CO.		lb.	lb.	
6.15 a.m.	200	-	—	—	-		—
6.45	200		—		—	-	—
7.15	200				-	—	
7.45	200	—			-		—
8.15	200	-			—		—
8.45	200	-		—		—	-
9.0	—	5·12	2·54	43·80	33·2	83·81	27·84
9.15	200	—		—	—	—	—
9.30	—	5·55	2·99	45·85	29·5	93·75	29·14
9.45	200	-	—	—	—	—	—
10.0	—	7·79	3·99	44·63	21·4	129·24	29·37
10.15	200	—			—	—	—
10.30	—	7·70	4·61	48·47	20·1	137·60	30·81
10.45	200	-	—	—	—	—	—
11.0	—	7·82	4·70	48·57	19·8	139·68	30·88
11.15	200	—	—	—	—	—	—
11.30		8·01	4·81	48·55	19·3	143·30	30·86
12.0 m.	—	—	—		19·3	143·30	
12.30 p.m.	—	15·21	0·25	2·52	19·3	143·30	1·60
12.45	200	—	—		—		
1.0	—	—			20·05	137·91	
1.30	—	14·11	0·21	2·28	20·8	132·96	1·49
2.0	—		—		21·05	137·94	-
2.30	—	13·62	0·33	3·67	21·3	129·85	2·31
2.45	200		—	-	—		
3.0	—	14·50	0·18	1·95	19·4	142·56	3·14
3.30	-	13·18	0·29	3·39	22·0	125·34	2·12
3.45	200	-	—	—		—	—
4.0	—	14·96	0·38	3·84	19·3	143·30	2·44
4.30		14·18	0·41	4·35	20·3	136·25	2·76
4.45	200	-					
5.0		13·01	0·41	4·72	22·0	125·31	3·0
Mean quantity of air					21·653		
Mean of all but first two					20·36		
Mean ratio of loss : first six, per cent.							29·65
Mean ratio of loss : last eight, per cent.							2·36

Table II.—Loss of Efficiency due to Excess of Air and Temperature of Escaping Gases above Temperature (Temperature of Escaping Gases above Atmosphere).

Excess Air as per cent. of Air Theoretically Required for Complete Combustion	B.T.U.	Loss per cent. of Total Heat Value of Coal.	Total B.T.U.	Loss in per cent. of Total Heat Value of Coal.	Total B.T.U.	Loss in per cent. of Total Heat Value of Coal.
				7·9		9·9
			1,354			14·4
	1,176				1,959	16·7
	1,336		1,781	18·2		
		12·7			2,492	21·2
			2,420			
		16·8			3,291	

The fact that coal is a substance varying in properties and qualities was emphasised by the author, and in these days of recorded data and strict economy in engineering it is somewhat surprising that coal, our chief fuel and main expenditure, should have escaped the balance and the measure so long. To the marine engineer a more accurate knowledge of the fuel he is burning would undoubtedly be an advantage. This, combined with a slight knowledge of practical funnel gas analysis, and the simpler apparatus to perform these interesting experiments and tests would, the author ventured to assert, lead to better results than are to be obtained in the ordinary run of things from the taking and studying of the indicator card. To the marine engineer, therefore, the application of coal analysis and funnel gas testing is open to a wide field of interesting and useful research, for to the marine engineer the engine room and stokehold are his research laboratory, the place where his chief experience is to be gained, and the fascination is the research work in an engine room is never ending, never without interest and always instructive.

The marine engineer can check the weight delivered, he can sometimes, when present, regulate the moisture added. Then, when the ship is coaled, to the owners, a ton of coal is a ton of combustibles. In some instances, does not the owner pay for sea water and shingle at coal prices, and when the results achieved are not quite satisfactory, are there, under the present conditions, sufficient data to adjust the discrepancy? How is the marine engineer to gauge the happy medium between too much and too little air supply for a change of coal? In fact, what possibility has the chief engineer to justify results? For a true estimate of coal cannot be obtained from merely viewing. The addition of a snap analysis apparatus would, where recorders are not fitted, be a step in the right direction as regards the air supply, and a system of sampling when coaling, and also during the voyage, with an approximate analysis of the samples, say, when reaching port, would possibly be a remedy for the other. The purchase of coal by its calorific value and the systematic approximate analysis of a fuel is finding high favour among large consumers ashore. The question is, can a satisfactory modified form be adopted in the marine world?

PUBLICATIONS RECEIVED.

[*A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.*]

A Treatise on the Law Relating to the Insurance of Freight. By George Maitland Lazarus, M.A., LL.B London: Butterworth & Co., Bell Yard, Temple Bar, W.C. 10 in. × 6 in. × 1¼ in. pp. 290.

The author prefaces his work by stating that a century ago—according to a report in Dow's Report—"those who had been most concerned in settling what was the law on the subject of marine insurance had taken great credit to themselves for its certainty, and text-writers had boasted of how little uncertainty there was in this branch of law," but as was pointed out by Lord Eldon, "it might perhaps be found, when the matter came to be examined with the proper degree of impartiality, that there was full as much uncertainty on this subject as in any other branch of the law." Lord Eldon's criticism was fully justified. Even at the present time there are few subjects which present to the lawyer so many difficulties as the law of marine insurance, and particularly that branch of the law of marine insurance which relates to the insurance of freight. In the present volume under review the author states the principles of law which govern the insurance of freight. The work is essentially a reference book, and follows the lines usual with works of this character. It is well arranged and the points are lucidly brought out.

A Treatise on Hand Lettering for Engineers, Architects, Surveyors, and Students of Mechanical Drawing. By Wilfrid J. Lincham, B.Sc., M.Inst.C.E., M.I.Mech.E., M.I.E.E. London: Chapman & Hall, Ltd., 11, Henrietta Street, W.C. 12½ in. × 8 in. 282 pp. Price, 7s. 6d. net.

The difference between a good and bad set of drawings is often determined by the quality of the lettering thereon, and it is to be feared that the subject of hand lettering is one which many draughtsmen do not pay as much attention to as the subject merits. In the volume under review the author points out the fundamental differences between hand lettering and type, and proceeds from this to the various forms of letters used by draughtsmen and architects. In the course of his examples he takes the most useful alphabets and gradually works up until at the end of the book the more decorative ones come under consideration. The volume has been written from a practical standpoint as well as a theoretical, and many good pieces of advice are embodied. For example, the author points out that the best ink is made from stick ink properly rubbed down, but as this process occupies some time at the commencement of the day's work it has very largely been superseded by the various types of bottle ink, most of which have been given a waterproof character. It has been his impression—and most draughtsmen will agree with the author—that such ink is too fluid and tends to the formation of blobs of ink on the thickened parts of letters, while its habit of caking on the pen is probably an even more objectionable feature. Examples of titles suitable for architectural drawings in mediæval lettering and titles as practised by engineers and others in the drawing offices of manufacturing concerns are provided, while there is also an example of a surveyor's field book showing the method of lettering as well as a complete plan of a survey. Drawings for zincography and drawings for the Patent Office are also dealt with from which it will be seen that the subjects covered are comprehensive. There are in all 117 specimen subjects, the various features of which are explained, and the notes thereon embody points very useful to draughtsmen. The publication deserves to be widely known among those employed in drawing offices and the like. At the end of the book are some supplement plate drawings showing the style of lettering best adapted to the different subjects.

TRADE PUBLICATIONS.

[*Copies of any of the publications mentioned in this section will be sent on application to the firms by which they are issued.*]

Induction Motors.—Descriptive List No. 2,142A, issued by the British Thomson-Houston Company, Ltd., Rugby, deals with two and three-phase induction motors. As is customary with these lucid publications, comprehensive descriptions and illustrations are given, while as an aid to firms intending to install them there are diagrams showing the minimum permissible diameters of pinions as well as detailed dimensions and weights of the motors.

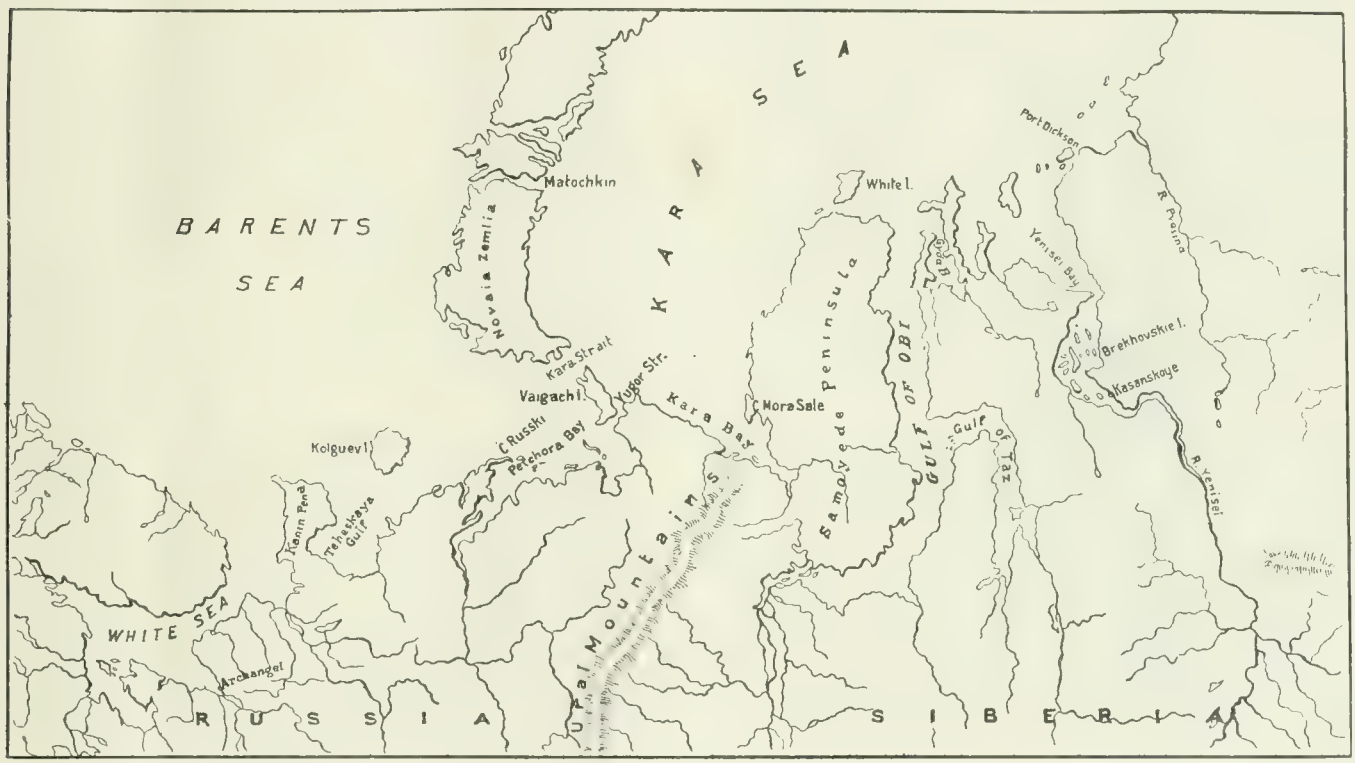
The Heating and Ventilating of Factories.—The important subject of heating and ventilating of factories is admirably dealt with in the publication recently issued by Davidson & Co., Ltd., Sirocco Engineering Works, Belfast. The question of choice of system is thoroughly discussed and details are given of the heating and ventilating appliances manufactured by this firm. We note that among the installations which they have fitted up are the engine house of the Gladstone Dock, Liverpool; the works of J. & E. Hall, Ltd., Dartford; Brown Bayley's Steel Works, Sheffield; besides a number of public buildings and, of course, a very large amount of work on passenger steamships.

THE KARA SEA ROUTE.

With the arrival of the Norwegian steamers *Haugastoel* and *Eden* at Grimsby, with cargoes of butter, hemp, flax and other produce from Central Siberia, attention has once more been drawn to the Kara Sea route which these vessels took. The two ships, of 3,000 and 2,000 tons respectively, were chartered by the Siberian Steamship, Manufacturing & Trading Company, Ltd., and the cargoes, which they brought from the Yenisei and Obi districts, are valued at £350,000.

The most modern attempt to establish a regular service through the Kara Sea was made by Mr. Lied, Director of the Siberian Company, in 1912, but this was not successful, the vessel having to turn back. On the second occasion—in 1913—he, in conjunction with Dr. Fridtjof Nansen, the celebrated Arctic explorer, and some other guests, set out at the beginning of August. The Siberian Company had chartered the steamer *Correct*, of 1,550 tons d.w., for this purpose. This steamer was built in Holland in 1908, but it may be noted that she was constructed for ordinary trading and not specially for Arctic service. Her length is 225 ft. overall, and she draws, when fully loaded, about 17 ft. She is fitted with triple-expansion engines, which drive her at about 10 knots under favourable conditions, but on the voyage in question she carried over 1,000 tons of cement in barrels, and her speed was rather less. In order to withstand ice, the *Correct* had had her bows sheathed with oak planks from about 2 ft. above to 4 ft. below the water line. The best way to fix on the planks for this purpose is to lay them horizontally, but owing to mechanical difficulties it was deemed advisable to fasten them perpendicularly by two iron bands above and below. Thus fixed, they performed their function very well, enabling the ship safely to force her way through the floes in narrow waters. At that time wireless stations were being established at Vaigatch, Yugorsky Shar, and also one on Yamal, and in order to take advantage of any messages these stations might send out as to the ice conditions wireless apparatus was installed in the chart room of the *Correct*. As a matter of fact, owing to the inexperience of the operators at the shore stations, the ship was not able on the voyage outwards to establish proper communication with the stations in question, so that it was deprived of services which would have been extremely valuable. This defect was, however, rectified by the time the vessel turned homewards, and on the return journey considerable use was made of these stations.

It is not proposed here to detail the voyage of the *Correct* to the mouth of the Yenisei or to enter into the difficulties which were met with from time to time. If our readers wish to pursue this further they will find the subject dealt with both thoroughly and entertainingly in Dr. Nansen's book "Through Siberia: the Land of the Future," published by William Heinemann, London. Suffice it to say that the passage was a difficult one, and after getting the *Correct* aground once or twice in the Yenisei itself they made their haven on August 28, and began to discharge the cargo. During this voyage the *Correct* had touched the ground five times and,



Map of North Russian and Siberian Coasts showing the Kara Sea and the Obi and Yenisei Rivers.

as a matter of fact, on her homeward voyage she brought this total up to seven, by going aground twice in the Yenisei estuary.

The next expedition was made last year, when Mr. Lied took out two cargo steamers of about 3,000 tons each, four river steamers under their own steam, and also towed out two barges, each having on board a river steamer built by J. I. Thornycroft & Co., Ltd., and shipped in sections for re-erection out there. On this occasion as on the previous one a cargo of cement was taken out.

The expedition which set out this year was, of course, filled with a new significance owing to the importance of increasing exports from Russia, and Mr. Lied is so satisfied with the results of his three years' enterprise that he is proposing to send out between 20 and 30 ships next year.

The importance of the trade route is obvious. The 1913 and 1914 expeditions established the possibility of making use of the Yenisei. This year the company was also able to make use of the Obi River, which traverses some of the most fertile districts of Central Siberia, and the *Haugastoel* was able to take a full cargo there. The Obi is well provided with river craft, there being something like 350 river

steamers and 650 sailers, so that it is estimated that these vessels can bring down to the deep-water wharves something like half a million tons of freight a year, and thus relieve the congestion which is at present being experienced by such cities as Omsk, Tomsk and Irkutsk, each of which has a population of something like 130,000 inhabitants, and where our Arctic people going to the theatre in evening dress. It will be seen, therefore, that the districts within easy reach of these two rivers are by no means the barren tracks that so many people imagine Siberia to consist of entirely.

The last voyage was made in 19 days from Tromsö, 11 days being occupied in going out and 8 in returning. The 1913 expedition took 23 days to go out and, whereas this first voyage was interrupted by various factors, of which running aground seven times was not

EXCESS PROFITS DUTY.

At the time of writing no new development has taken place in regard to the manner in which shipping profits will be treated under the Finance Bill. No novel point in regard to them was raised on the second reading debate, but doubtless something will be said about them in the course of the Committee stage.

We have already stated our objections to steps which will diminish the capital of the shipping industry in face of foreign competition. Granting that the necessities of the nation do demand this eating into future capital in the shape of the excess profits duty, we are concerned to see that the evil should be kept within as narrow bounds as possible.

A datum line of exemption of 6 per cent. in relation to

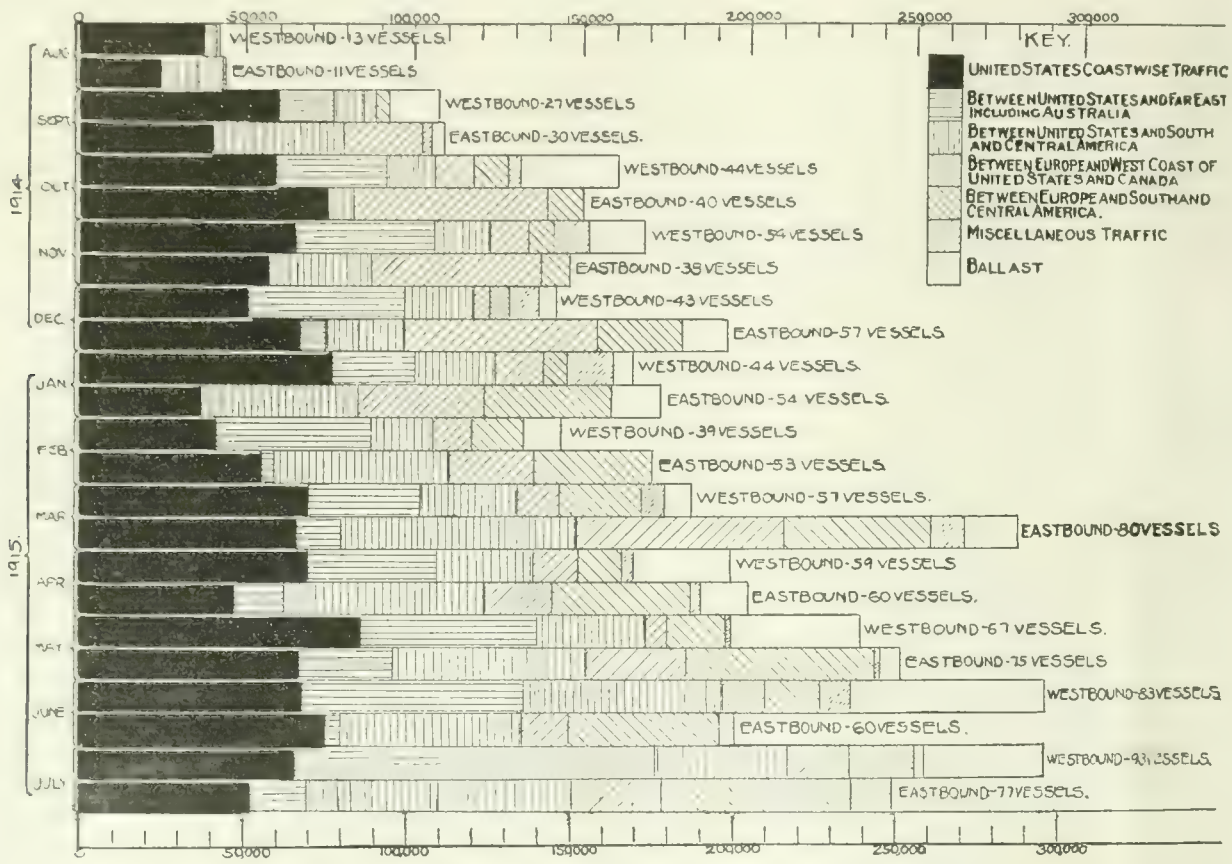


Chart of Net Tonnage of Traffic through the Panama Canal.

The above chart appears in the current issue of the Official Canal Record, and shows graphically the relative tonnage of ship movements through the Canal over the five great routes which constituted the course of over 97 per cent. of the laden vessels passing through the Canal to August 1, 1915. The remainder of the traffic is over miscellaneous routings and of vessels in ballast, the relative proportions of which are also shown. The chart shows the aggregate net tonnage (Panama Canal measurement) of vessels moving in each direction, from Atlantic to Pacific and from Pacific to Atlantic, over each route every month. The abscissæ at top and bottom of the chart indicate net Canal tonnage, in units of 10,000, and all the parts are drawn to scale.

the least noteworthy, the last two years have been free from such mishaps. At the same time it must not be imagined that the voyage is one to be undertaken lightly. Mr. Lied took three years of careful study and initial exploration before he ventured on his 1912 trip, and even then it was not a success. Such official charts as exist are unreliable, and in many cases quite misleading, and it is only by carefully noting these errors and making good omissions that the last two voyages have been made with such immunity from serious mishaps. We refer further to this point in a note on page 338.

In our issue of November 12, 1914, we also referred to the Kara Sea route and especially to the suggestions made by Dr. Nansen for the establishment of an efficient observation and patrol service for giving in advance information regarding the ice conditions.

capital which has been only modestly remunerative is all very well for certain enterprises. For shipping it would be unfair. In its case the pre-war standard on which excess profits are calculated ought to be relatively high owing to the fluctuating character of its profits. The proposal that the normal standard should be the average profits of any two of the last three years is an improvement.

When it comes to entrusting to a Board of Referees to say whether in regard to a certain class of capital hitherto relatively unremunerative, a 6 per cent. standard of exemption is just for an industry or ought to be raised, we are scarcely on firm ground. At the same time we have confidence in the justice of a higher datum line for shipping profits. Something must be done to recoup to it the great amount of depreciation and loss which has occurred during the war.

First Part of the 1914 Fleet at the Mouth of the Yenisei.

Second Part of the 1914 Fleet at the Mouth of the Yenisei.

Transhipping Cargo at the Mouth of the Yenisei.

Prisoners of War engaged on River Work.

Government River Boats on the Yenisei.

Some of the Inhabitants of the Yenisei and Obi Districts.

Landing Stages and River Boats on the Yenisei.

A Fishing Station at the Mouth of the Yenisei. (*See page* 343.)

YMUIDEN AND THE NORTH SEA CANAL.

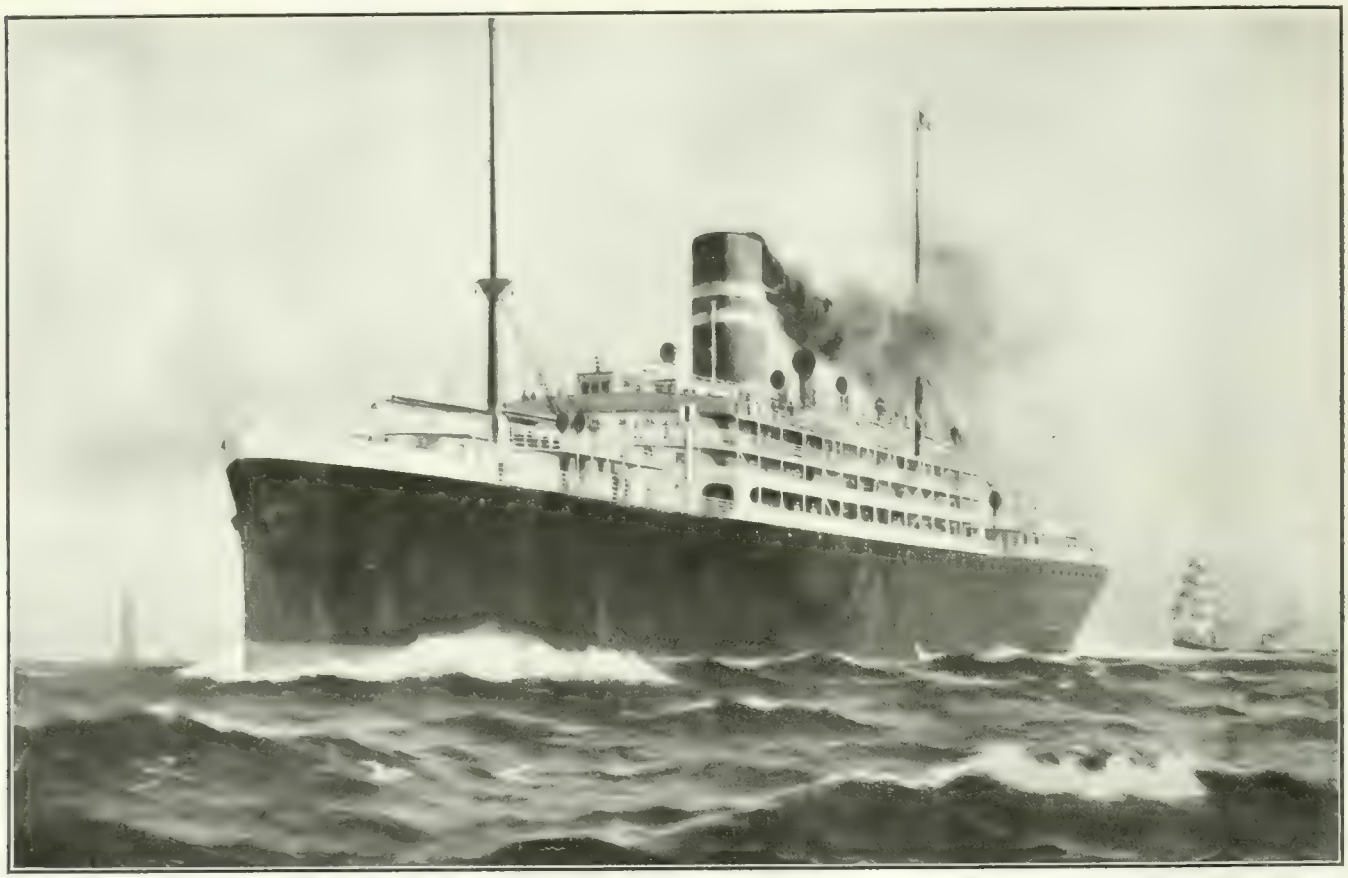
The Dutch Government is taking measures to erect a new lock south of the existing one at Ymuiden, to enlarge the outer harbour, to build new entrance canals deeper the North Sea Canal and protect the whole of the works by fortifications. It is estimated that the new lock alone will take seven years to complete. A Commission reporting in 1911 on the matter of access to the Netherlands through the North Sea Canal, suggested a new lock, 1,180 ft. long, 130 ft. in clear width and 46 ft. sill depth, New Amsterdam water level (43 ft. below low water, 48 ft. below high water and 44 ft. below canal water level). These dimensions exceed those of the Panama locks. In order that further extensions or additions may not be necessary for a long time, it is proposed to make the new lock 1,310 ft. by 148 ft. by 49 ft., N.A.W.L. (46 ft. below low, 51½ ft. below high and 47½ ft. below canal water level). This lock will be the largest in existence and will establish an important precedent for new works of this type.

In the sea between the harbour moles and in the mouth of the harbour, there is or can be preserved by natural flow and dredging a depth of 46 to 47½ ft. below N.A.W.L. (48 to 50 ft. below high water). A lock of 49 ft., N.A.W.L., sill depth would permit ships of 46-ft. draught to traverse the canal and would also form a reserve for all shipping in the event of the present lock being incapable of use at any time.

The centre line of the new lock will be 520 ft. north of and parallel to that of the present lock and the outer front will be 850 ft. further inland. Connection with the North Sea harbour and the main canal will be by approach canals cut to the same depth as the lock at either end of the latter and thence carried to the same depth as the outer harbour and the Ymuiden-Amsterdam canal respectively. A harbour for dredgers, &c., together with the necessary stores and workshops will be cut on the north side of the outer approach canal, opposite the existing fishing harbour.

The canals are to be deepened as need for deeper fairway arises. At first ships of 36 ft. draught can go through the canal to Amsterdam by waiting for high water in the outer harbour before entering or leaving the canal. By the time the new lock is completed or even sooner, it may be necessary to provide for vessels of 40 ft. draught, requiring a depth of 39½ ft., N.A.W.L. (36½ ft. at low water and 41½ ft. at high water). There is a possibility that a depth of 39½ ft. or more, N.A.W.L., cannot be maintained between the existing moles, so that when ships of 40 to 46-ft. draught desire access to Amsterdam, the existing northern mole will have to be extended or replaced by one reaching further seaward, the present southern mole remaining as it is. Probably a new northern mole will be built 2,000 ft. north of the present one, thus giving the enlarged outer harbour a convenient form, with its centre line 1,000 ft. further north.

The cost of the new lock and approach-canals is estimated at £1,200,000 and that of enlarging the outer harbour, deepening the main canal and erecting defensive works at £2,900,000, *i.e.*, at least £4,100,000 total, to which will later be added the cost of deepening the waterways for ships of 46-ft. draught.



The Nelson Liner "Highland Warrior" (7,485 tons), which lies in a dangerous position ashore near Corunna.

The *Highland Warrior* was built in 1911 by Russell & Co., of Port Glasgow, and engined by Rankin & Blackmore, of Greenock.

Taking Oil at Balboa.—Directions have been issued that no charge for wharfage shall be made against vessels tying up at the oil crib at Balboa for the sole purpose of taking oil, whether from the tanks of the Panama Canal or from those of private corporations. This is in line with the previous order that no charges should be made for wharfage on vessels tying up to take on coal or other supplies from the Panama Canal.

TRIALS OF THE UNITED STATES DESTROYER "ERICSSON."

The torpedo-boat destroyer *Ericsson* is one of six destroyers of the same class authorised by an Act of Congress approved August 22, 1912, and the contract for the *Ericsson* was awarded to the New York Shipbuilding Company, Camden, N.J., for £174,700, with delivery in 24 months. The contract speed was 29 knots at about 1,090 tons displacement, with 17,000 s.h.p. Particulars of the vessel and trial data have been communicated to the American Society of Naval Engineers by Mr. W. H. A. Lange, and published in

Standardisation Trials, U.S.S. "Ericsson," May 18, 1915.

No. of run.	Time on course. Min.	Sec.	Speed in kts.	R.P.M. Starbd.	Port.	Mean.	S.H.P. Starbd.	Port.	Total.	Mean of group. Speed.	R.P.M.	S.H.P.
1	8	18·9	7·22	126·65	124·87	125·76	86	91	177			
2	7	3·1	8·51	135·85	136·85	136·35	84	100	184	7·96	131·71	184
3	7	55·1	7·58	127·19	129·55	128·37	79	111	190			
4	5	2·8	11·89	196·03	191·64	193·84	291	289	580			
5	5	19·6	11·26	188·78	184·82	186·80	268	270	538	11·51	189·43	549
6	5	10·2	11·61	192·44	188·11	190·28	274	264	538			
7	3	44·1	16·06	262·97	267·47	265·22	780	815	1,595			
8	3	50·5	15·62	263·03	269·74	266·39	699	887	1,586	15·87	265·54	1,561
9	3	42·7	16·17	261·11	267·19	264·15	694	781	1,475			
10	3	00·3	19·97	345·87	343·83	344·85	1,732	1,802	3,534			
11	2	56·3	20·42	343·09	342·07	342·58	1,718	1,709	3,427	20·08	341·32	3,400
12	3	4·5	19·51	338·38	332·13	335·26	1,653	1,558	3,211			
13	2	26·0	24·66	437·24	436·37	436·18	3,866	4,068	7,934			
14	2	31·0	23·84	436·27	437·16	436·72	3,803	4,049	7,852	24·25	436·96	7,850
15	2	26·1	24·64	438·12	437·06	437·59	3,792	3,968	7,760			
16	Not used.											
17												
18	2	16·5	26·37	503·60	512·54	508·07	*	*	*			
19	2	16·4	26·39	503·81	510·09	506·95	5,825	6,185	12,010	26.45	508·50	12,180
20	2	15·1	26·65	507·63	516·40	512·02	5,869	6,481	12·350			
21	2	5·1	28·78	603·93	625·54	614·74	8,103	9,376	17,479			
22	2	2·2	29·46	601·57	615·79	608·68	8,257	9,155	17,412	29·06	610·75	17,416
23	2	6·1	28·55	604·31	617·44	610·88	8,220	9,142	17,362			
24	2	0·5	29·88	607·07	622·19	614·63	8,332	9,325	17,657			
25	2	6·3	28·50	609·24	622·63	615·94	8,513	9,256	17,769			
26	1	59·6	30·10	608·25	623·60	615·94	8,349	9,347	17,696	29·33	616·98	17,796
27	2	6·1	28·55	612·61	625·47	619·04	8,598	8,375	17,973			
28	1	58·4	30·41	612·25	626·38	619·32	8,555	9,274	17,829			

* No s.h.p. obtained on this run.

the Journal of that Society. From it we abstract the following particulars.

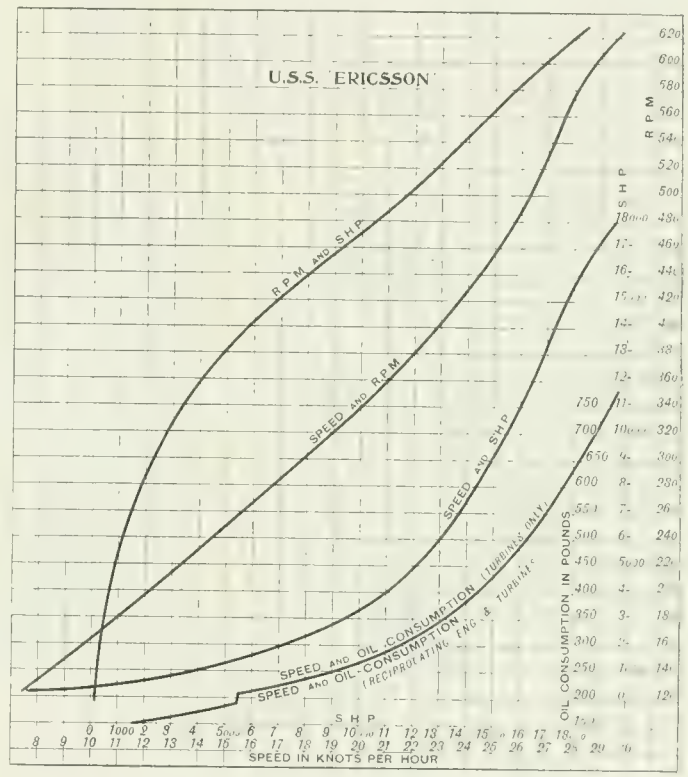
The *Ericsson* is a twin-screw vessel equipped with Parsons turbines (main engines) in combination with a single reciprocating engine for cruising speeds. The vessel has the following dimensions:—

Length on L.W.L.	300 ft. 7 in.
,, overall	305 ft. 3 in.
Breadth on L.W.L.	30 ft. 6 in.
,, over guards	31 ft. 1 in.
Draught, mean	9 ft. 9 in.
Displacement, normal	1,090 tons.
Tons per inch immersion at normal draught	14·50 ,,
Area immersed, midship section	204 sq. ft.
Block coefficient	0·427
Fuel-oil tanks, capacity	309 tons.
Reserve feed-water tanks, capacity	18 ,,
Additional, in cofferdam	18 ,,
Fresh-water tanks, capacity	17·5 ,,

The arrangement of machinery spaces, store rooms, officers' and crew's quarters, fuel-oil stowage tanks, reserve feed and fresh-water tanks and other minor compartments is, in general, the same for all destroyers of this class.

A vertical, inverted, direct-acting compound reciprocating engine, $\frac{16 \times 24}{18}$, with cranks at 180 deg., is arranged forward of the low-pressure and astern turbine, on the port shaft; the main high-pressure ahead turbine and an independent astern turbine are mounted on the starboard shaft. The main engines are designed to develop 17,000 s.h.p. at about 600 r.p.m. when propelling the vessel at the contract speed of 29 knots.

A disconnecting clutch, of the Metten hydraulic type, is interposed between the cruising engine and the low-pressure turbine for cruising speeds up to 15½ or 16 knots. When speeds greater than this are desired, the clutch is released without stopping the engine.



U.S.S. "Ericsson."—Speed, Power and Consumption Curves.

This clutch is operated with oil at a pressure of about 70 lb. per sq. in.

A significant feature in connection with the arrangement of valves and piping to the reciprocating engine is, that, should the pressure of oil on the clutch diaphragm suddenly drop, the throttle of the reciprocating engine automatically closes instantly, thus preventing this engine from racing. Steam cannot be admitted to the astern turbine on the same shaft while the reciprocating engine is in use; neither can the throttle to reciprocating engine be opened while the port astern turbine throttle is open. By a slight movement of the handwheel on the cruising-engine throttle, through an arc of 30 deg., the astern throttle is locked in closed position and the oil cock opened, applying full pressure to the clutch, which engages instantly, and to the governor valve of reciprocating engine, placing it in position for immediate action in case of emergency. The clutch is not again released until at the instant the throttle valve is closed. Steam can be admitted to the low-pressure ahead turbine on the same shaft while the cruising engine is in use.

The following is the propeller data :-

[illegible]

There are four Thornycroft water tube boilers fitted for oil burning. The total heating surface is 23,936 sq. ft., and the working pressure is 265 lb. The oil burners are of the Schutte-Koerting type, there being 11 to each boiler.

The contractors guaranteed that the fuel-oil consumption per knot run for all purposes, including that necessary for all auxiliaries in use on the trials, would not exceed 675 lb. at guaranteed maximum speed, 435 lb. at 24 knots, 200 lb. at 15½ knots, and 160 lb. at 12 knots, the consumption of fuel oil at these speeds to be determined by the Trial Board from a curve based on the rate of fuel oil consumed on trials (*b*), (*c*), (*d*) and (*f*), and corrected to a standard of 19,000 British thermal units per lb. of fuel oil.

Progressive Trial Data U.S.S. "Ericsson."

	4 hour full power.	4 hour 24 knot.	4 hour [illegible] knot.	4 hour 12 knot.	2 hour 15½ knot.
Date [illegible]	May 19, 1915.	May 20, 1915.	May 20, 1915.	May 18, 1915.	May 20, 1915.
Displacement (corresponding) tons	1,087·1	1,097·8	1,089·2	1,096·3	1,100
Draught, mean, ft. and in.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Speed, knots	29·29	24·115	15·448	12·056	15·493
Propellers, slip, per cent., starboard	24·48	12·68	-6·18	1·04	3·25
,, ,, ,, port	27·23	13·79	16·75	9·35	9·90
,, ,, ,, mean	25·86	13·24	5·29	5·20	6·58
R.P.M., starboard	[illegible]	436·53	232·77	189·92	249·65
,, port	627·45	436·09	288·01	207·32	268·05
,, mean	616·02	433·32	260·39	198·62	251·85
Engines in operation	turbines		turbines cruising engine		turbines
S.H.P., average, starboard	8,267	3,740	[illegible]	215	622
,, ,, port	8,884	3,410	773	175	509
,, ,, total	17,151	7,150	1,099	420	1,131
I.H.P., average, cruising engine	—	—	770	185	—
Number of boilers in use	4	3	1	1	2
,, burners used (11 per boiler)	10·31	7·42	6·5	4	8
Heating surface used, sq. ft., total	23,936	17,952	5,984	5,984	11,968
,, ,, ,, per S.H.P.	1,347				—
Pressures, average—					
Main steam, gauge	253·41	250	245·63	248·13	243·75
,, in engine room, gauge	248·25	241·5	241·5	239·88	238·63
Cruising engine, high pressure, chest, gauge	—	—	208·75	91·25	—
Cruising engine, L.P. receiver, gauge	—	—	91	43·75	—
,, ,, exhaust ,,			32·61	23·10	
Main turbines, H.P. steam chest, abs.	249·0	209·88	25·72	26·25	55·88
,, L.P. ,,	25·0	12·50	2·56	2·38	3·88
,, H.P. exhaust ,,	246·69	106·69	21·73	18·50	26·88
,, L.P. 2nd ,, ,,	19·75	10·69	1·91	3·21	5·0
Cruising engine, gauge	3·98	40·0	4·65	3·9	4·0
Auxiliary steam, gauge	250·13	245·63	236·63	226·63	256·88
,, exhaust ,,	7·93	4·05	9·44	9·19	7·56
Vacuum, main condenser, inches mercury	28·18	29·20	27·84	28·88	29·21
Barometer, inches mercury	30·23	[illegible]	30·24	30·06	30·26
Air in stokeholds, inches water	6·38	4·52	3·69	2·63	1·83
Feed water at heater outlet, gauge	305·98	[illegible]	[illegible]	[illegible]	320
In feed heater shell, gauge	5·5	3·12	7·63	8·63	5·13

Progressive Trial Data U.S.S. "Ericsson"—*continued.*

	4 hour full power.	4 hour 24 knot.	4 hour 15½ knot.	4 hour 12 knot.	2 hour 15½ knot.
Forced lubrication system, gauge	10	10·63	9·75	10·11	10
Fuel oil service pumps, discharge, gauge	175·47	126·25	148·43	142·5	121·88
,, booster ,,	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
,, pressure to burners ,,	169·38	122·5	143·13	125·75	123·75
Lubricating oil pressure to clutch	[illegible]	[illegible]	70	70	[illegible]
Temperatures, Fahrenheit—					
Outside air	59·88	61·88	59·63	60·5	60·5
Engine room	82·69	88·25	89·88	91·38	89·5
Auxiliary room	90·13	91·88	95·38	96·75	93·63
Stokeholds	86·25	87·32	86·25	98·25	97·25
Main injection	55·44	54·38	57·00	58·13	57·13
Outboard delivery	71·13	64·50	58·25	59·13	58·88
Main air pump discharge	82·91	77·63	73·13	91·25	81·13
Feed tank	83·38	79·63	87·38	93·38	87·38
Feed water (from heaters)	173·26	192·00	207·25	218·75	200·25
Oil to cooler	107·50	102·25	95·75	96·0	90·38
Oil from cooler	93·88	90·75	86·75	84·0	82·38
Water from cooler	58·0	58·38	60·70	60·75	61·63
Oil drains from bearings, average	108·0	101·95	94·55	92·67	90·73
Fuel oil to heaters	68·57	69·38	72·0	81·0	75·75
,, from heaters to burners	134·54	134·05	148·57	122·25	137·25
Funnel gases (pyrometer)	616·56	511·88	481·88	413·13	390·0
R.P.M. forced draught blowers	1,685·70	1,297·29	1,323·13	944·38	1,078·13
,, main circulating pump	717·81	573·75	442·5	596·25	586·25
Double strokes per minute, of pumps—					
Main air	27·57	27·88	34·0	32·13	21·38
Main feed	31·51	28·25	11·88	11·0	12·75
Fire and bilge	32·36	32·38	40·0	42·5	28·5
Lubricating oil	46·25	40·50	49·75	39·5	36·0
Oil cooler circulating	73·88	68·0	48·5	45·75	48·0
Fuel oil service	25·88	12·69	11·25	4·25	16·0
,, booster	42·19	31·25	22·75	—	24·5
Water consumption, all machinery	280,145	132,933	40,575	30,662	54,317
,, ,, ,, per S.H.P. main engines	15·762	17·40	28·275	42·286	37·589
Cooling surface main condenser, sq. ft. per s.h.p.	[illegible]	1·414	7·52	17·008	7·474
Fuel oil consumption, lb. per hour	21,856·4	9,333·99	2,906·77	1,848·47	3,182·07
,, ,, ,, knot run	746·2	387·89	188·17	153·33	205·39
,, ,, ,, s.h.p. per hour	1·230	1·224	2·026	2·911	2·202
Specific gravity	·8767	·8767	·8767	·8767	·8767
B.T.U. per lb.	19,474	19,474	19,474	19,474	19,474
Lb. water evaporated per lb. of oil per hour	12·818	14·211	13·959	16·588	17·070

American Naval Research.—The New York correspondent of the *Daily Telegraph* says that the American Naval Consultation Board, representing a big effort to mobilise the inventive and industrial talent of the entire country for national defence, has now definitely recommended the construction of big experimental works, where research can be made, and of which the utmost secrecy will be the dominating feature. Mr. Thomas Edison, Chairman of the Consultation Board, estimates that the cost of the plant, grounds, buildings, equipment, &c., will involve an outlay at the start of £1,000,000 roughly, and an annual expenditure of £500,000 or more. The site has not yet been chosen, but it will probably be located on a tidewater of sufficient depth to permit a Dreadnought to come to dock. To secure secrecy the entire works will be surrounded by a high fence, constantly patrolled by armed guards, and visitors will be rigidly excluded. The Naval Consultation Board, consisting entirely of patriotic civilians invited by the President to co-operate with the American Admiralty, has arranged to meet every 60 days.

GENERAL NEWS SECTION.

PERSONAL.

Mr. Joseph Gibson, of Elleslea, Broughty Ferry, a prominent shipowner and marine insurance broker of Dundee, who died on June 30 last, left estate of the gross value of £84,210.

The death is reported from Hallgarth, Tasmania, at the age of 75, of Captain John Bruce, who was Harbour Master of the Tyne from 1883 until a few years ago, when he retired.

Mr. Edwin Charles Carnt, of Wootton, Isle of Wight, Managing Director of the shipbuilding firm of J. S. White & Co., of Cowes and Gosport, left £127,260.

Captain J. R. Moore,
Who saved the crew of the *Dunsley*.

Mr. Jonas Lied,
Director Siberian Steamship, Maritime & Trading Co., Ltd.

Captain German.
James German & Co., Cardiff.

Lieut. James German, who has done much in the way of obtaining recruits in Glamorganshire and Monmouthshire, has been promoted to a captaincy. He has proved himself worthy of promotion for at the outbreak of war he joined the army, in which he took an active interest in peace time, and has worked strenuously in the recruiting campaign. Captain German is a very popular Cardiff docksman, being head of the firm of James German & Co., Cardiff, chartering and colliery agents, and senior in the shipowning concern of Macarthy & German, Newcastle, and Lindsay, German & Co., Swansea, shipbrokers. He was born in London 37 years ago and for four years was honorary secretary of the Cardiff branch of the Coal Trade Benevolent Association. On resigning this position he was given a seat on the London Board and made a life member.

Mr. Jonas Lied who, for the third year in succession, has demonstrated the possibility of employing the Kara Sea route for tapping the resources of Siberia, is a Norwegian by birth. He has spent many years in England, Germany and Russia, and speaks the languages of these countries fluently. Siberia has been his special study, and for a long time his life's work. He claims to know Siberia and the Siberians better than any one else, and certainly none know that vast tract of Eastern Russia better than he. He carefully studied the trading requirements of Siberia, its imports and its exports, and before embarking on the enterprise which has proved so successful, made a detailed examination of commerce in the districts served by the Yenisei and Obi Rivers. He also made excursions from their estuaries to demonstrate the navigability of the waters thereabouts, and this knowledge in conjunction with investigations made from Tromsö eastwards, culminated in a successful passage in 1913, an earlier attempt—in 1912—having had to be abandoned. The last two trips have been free from mishaps, and underwriters, who have never yet had to meet a call on the ventures, are now more lenient with ships taking this route, always stipulating, however, that Mr. Lied shall accompany the expedition. Mr. Lied, who founded the Siberian Steamship, Maritime & Trading Company, Ltd., some six years ago, is not the discoverer of the route, nor is he by any means the only one to have ventured there for trading purposes, but he bids fair to go down to posterity as the man who demonstrated the possibility of utilising the Kara Sea route as a regular commercial venture and opening up to central Siberia a ready way of overcoming the export difficulties which have hampered commerce there.

At the offices of the Belfast Local Marine Board recently the Lord Mayor presented Captain Jas. R. Moore, of the ss. *Howth Head* with a solid silver salver in recognition of the services he rendered to the crew of the ss. *Dunsley* after that vessel had been sunk by a German submarine off the Fastnet on August 19. The salver was the gift of the London & Northern Steamship Company. (Messrs. Pyman Brothers, managers). The *Howth Head* was attacked by a submarine which fired a shell at her on the voyage from Swansea to New Orleans. She got away, and later in the day fell in with the crew of the *Dunsley* which had been shelled, two lives being lost. The *Howth Head* towed the boats towards land until a destroyer was met with which took them in charge. The Lord Mayor, in making the award, said that Captain Moore had acted as they would expect a Briton to. He wished him long life and happiness. Captain Moore, in reply, said he would feel more at ease being chased by a submarine than standing there. It was right that seamen should assist each other, and they would do so as long as they were afloat. On the motion of Sir Thos. Dixon, Bart., a vote of thanks was passed to the Lord Mayor for making the presentation which, we may add, would have been made by one of the directors but for the absence of two of them at the front and pressure of business on the others.

The death has occurred of Mr. William Mathwin, of William Mathwin & Sons, coal exporters and shipbrokers, of Exchange Buildings, Newcastle. Deceased was in his ninety-first year.

Captain R. P. Magey, Registrar for the Shipping Federation in Belfast since 1895, died last week. He had been 10 years in the mercantile marine, all of which were spent in sail. His father, the late Mr. Daniel Magey, owned a fleet of sailers in Belfast early in the last century.

On Friday of last week Princess Louise visited the naval construction works of William Beardmore & Co., Ltd., at Dalmuir. Her Royal Highness was received by the Marquess of Graham and Lord Provost Dunlop. Later, Princess Louise motored to the firm's Parkhead works, where the party were received by Sir William Beardmore and Lady Beardmore.

The gallant services performed by Captain Wood, master of the Leyland liner *Asian*, in towing the disabled steamer *Pinna* for a week during a succession of heavy gales in January, have been recognised by the committee of Lloyd's, who have decided to bestow their medal for meritorious services as an acknowledgment of the splendid seamanship and pluck displayed during the work of salvage.

Mr. W. R. Twaddle, who was with the Wallsend Slipway & Engineering Company, Ltd., for 23 years, and latterly as Accountant has recently secured an appointment as Chief Clerk to a new large works in Cumberland. As a mark of appreciation of his service, the staff, just before he left, presented him with a gold watch suitably inscribed, and to Mrs. Twaddle they presented a gold bracelet watch.

Mr. J. Elliott Seager, Director of the Cardiff firm of W. H. Seager & Co., Ltd., shipowners and ship store merchants, of which his father is the head, has been gazetted Second Lieutenant in the 20th Welsh. He volunteered, at the outbreak of war, for active service abroad and rejoined the Glamorgan Yeomanry, with which he had served four years. His brother, Mr. Willie Seager, is a Second Lieutenant in the South Wales Borderers.

The death has occurred at Barking, Essex, of Mr. P. J. King, who was formerly well-known in connection with shipbuilding and aeronautics. He superintended the launch of H.M.S. *Warrior*, one of the first ironclads built. He also built the celebrated 10-ton racing yacht *Buttercup*.

The death occurred on Monday of Sir Thomas B. Bowring, one of the directors of C. T. Bowring & Co., Ltd., managing owners for the Bear Creek Oil & Shipping Company, Camello Tank Steamship Company, English & American Shipping Company, Lobitos Oilfields, New York, Newfoundland & Halifax Steamship Company, Oil Tank Steamship Company, and the Red Cross Shipping Company. In addition to being one of the foremost authorities on oil transportation, Sir Thomas was an underwriting member of Lloyd's, being elected in 1891, and his name appeared at the top of the syndicate written for by Mr. Percy Hargreaves. He was also a director of the brokerage firm of C. T. Bowring & Co. (Insurance), Ltd. Although known and respected in "The Room," his visits to Lloyd's were few and far between, and he took no active part in the marine insurance market. Sir Thomas was a cousin of Sir William B. Bowring, Bart., and of Mr. F. C. Bowring, and received his knighthood in 1913.

In connection with ship-repairing on the Thames, few firms are better known than that of Mills & Knight, the principal of which, Mr. George Spencer Knight, J.P., passed away suddenly from heart failure on Saturday morning last, at his residence, "Invercarron," St. George's Road, Bickley, Kent. Mr. Knight, who was in his 57th year, was apparently in the best of health last week, for he was attending business even so late as Friday last. The deceased had spent practically the whole of his business life in close association with the firm of Mills & Knight. As a young man he served as an apprentice under his father, and up to the time of his father's death in 1907 he acted as manager, since when he has been the controlling head of the firm. He leaves a widow, three sons and one daughter. Two of his sons, Mr. James M. Knight, and Mr. F. W. Knight, are serving with the Colours. The former, who is a lieutenant in the King's Royal Rifles, is at present home from the front wounded. Mr. F. W. Knight is serving as a corporal in the Public School Corps of the Royal Fusiliers.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

As there does not now appear to be so much pressure in the Clyde yards for the delivery of Government work, more men are available for the completion of mercantile orders. In some of the yards, merchant vessels which were on the stocks before the war began are still unlaunched, but doubtless work will be resumed on these steamers as the supply of labour improves. Although few orders have been publicly reported during recent months, there is at present a pretty fair amount of new tonnage on hand. In fact, on the lower reaches of the river the work on hand is greater than it was at the corresponding date last year. The Greenock & Grangemouth Dockyard Company, for instance, are said to have booked an order for six cargo steamers of the better class for J. & J. Denholm, of Greenock. The vessels are to be of 1,980 tons gross each and of about 280 ft. in length. At Leith, John Cran & Co. are building three powerful tugs for Toronto owners, the firm having launched one of these vessels last week. These and other orders which are occasionally referred to in shipbuilding circles show that in spite of war conditions a good deal of work is in progress in the district.

Repair Work on the Clyde.

Repair work continues brisk both at Glasgow and Greenock. The Clyde Trust's dry docks were occupied at the beginning of the present week by the large steamer *Pakeha*, which will shortly load out for New Zealand, and the Hogarth liner *Baron Dalmeny*, which arrived in the Clyde recently from Hornillo, while the *Turret Court* is on the blocks at Elderslie. At Greenock, George Brown & Co. are overhauling a couple of trawlers, and Caird & Co. have completed the repairing of a large steam yacht and a river steamer. Russell & Co., Port Glasgow, have almost completed extensive repairs to the tug *Flying Wizard*, which was badly damaged in a collision on the river a few weeks ago.

Harbour Legislation Delayed.

On account of the war and the consequent need for economy in public expenditure certain proposed legislation affecting the harbour of Glasgow will probably be postponed indefinitely. It was the intention of the Corporation of Glasgow to introduce into Parliament shortly a Provisional Order in which sanction was sought for an agreement entered into recently between the Corporation and the Clyde Navigation Trust. Among other things this agreement provided that the control of the harbour ferries would pass from the Trustees to the Corporation, and that the ferries would be operated free from May next. The Clyde Trustees have assented to the postponement of the proposed Order.

MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

Liverpool.

At the local Munitions Court on Saturday, Cammell, Laird & Co., Ltd., prosecuted nearly 100 offenders. Mr. J. W. P. Laird, the Secretary of the Company, said the fines inflicted on September 18 had made no improvement, and matters had become slightly worse, if anything. The time-keeping on Mondays, he informed the Court was disgraceful, as will be gathered from the following records which he read:—In the two weeks after September 18, 16 per cent. of the men employed were out daily for the first quarter, and in addition 8 per cent. were out for the whole day. The time lost during the weeks in question was between one-sixth and one-seventh of the possible working hours, or, in other words, the men were working less than a five days' week on ordinary time. On one Monday recently out of a total of 11,400 men on the books, no fewer than 3,820 were absent during the first quarter, or a third of the total number employed. Nearly 1,200 of these did not put in an appearance during the rest of the day. The caulkers and drillers were the worst offenders. Fines varying from 5s. to 30s. were imposed.

Grain Discharging.

An arrangement has been arrived at between shipowners and the Corn Trade Association for the discharge of grain in bulk overside into craft where the consignments are not less than 75 per cent.

of the cargo carried. This arrangement will, no doubt, be regulated by the Mersey Docks Board and prevent the dock sheds being utilised for grain storage to the same extent as formerly. It will also better facilitate the movement of traffic at busy periods.

SOUTH WALES NOTES.

(From Our Own Correspondent.)

Cardiff.

The die has been cast for a struggle between the South Wales coal sellers and buyers. It will be recalled that some months ago the colliery owners intimated to buyers that they had resolved that for all contracts and sales of coal entered into for shipment f.o.b. on and after January 1, 1916, the terms of payment will be net cash at 14 days or cash against invoice less ¼ per cent. at the option of the seller. The Cardiff Chamber of Commerce considered the matter, and requested the coal owners to give the question further consideration as it was felt that the present was not the time for making such a change in the credit system. The colliery owners held another meeting and reaffirmed their decision, with the result that the Chamber of Commerce last week considered the matter in private and the principal buyers signed a protest and pledged themselves to do their utmost to resist the sellers' new terms. A committee was also appointed to carry the protest and pledge into effect. The outcome of the sellers' and buyers' decisions will be interesting to follow, but there is no doubt that much will depend on the actual state of the coal market and the many factors which may crop up from time to time. At present the buyers have the advantage as colliery owners are only too anxious to get rid of their outputs, but should available tonnage supplies undergo a material expansion the former would again be in a position to demand their own terms.

September Dry-Dockings.

Dry-docking in South Wales was not nearly so brisk during the past month as in previous months of the year. In fact, on only one occasion during the current year were the figures lower, viz., in April, when only 150 vessels of 369,089 gross tons were dealt with. Last month there were dry-docked in South Wales 167 vessels of 438,242 gross tons, 11 vessels more than in the corresponding month of 1914, but 6,240 tons less. Though the tonnage of the vessels dealt with were lower this does not mean that work was slack, for as often happens, big jobs will cause docks to be "blocked" for lengthy periods, and, as a consequence, the figures relating to those docks will naturally be lower. Appended are the returns for each port :—

Port.	September, 1914. Vessels.	Gross tons.	September, 1915. Vessels.	Gross tons.
Cardiff	79	237,617	80	212,029
Swansea	13	27,981	20	22,266
Newport	27	53,097	29	71,412
Barry	37	128,687	35	116,195
Port Talbot	—	—	3	9,340
South Wales	156	444,482	167	438,242

Increase of 11 vessels, but decrease of 6,240 tons.

A feature of the above is the fact that while both Cardiff and Swansea show increases in the number of vessels docked their tonnage in both cases record a substantial reduction, thus proving that on the average smaller vessels were dealt with than was the case in September of 1914.

Newport and Admiralty Dues.

At a meeting of the Newport Harbour Board last week an important discussion took place on the question of harbour dues of vessels belonging to or employed by the Admiralty, or on any stores the property of the Government. A letter was read stating that to those docks as were owned by railway companies and under Government control no payment would be made in future in respect to the foregoing. This was only to apply during the period of control, and without any prejudice to any course the Government might adopt at its termination. Mr. T. H. Mordey (Mordey, Jones & Co.), pointed out that they were pressing very hard in regard to this matter, and also that Newport had to maintain lights, dredging, staff and numerous other things, and yet the greater proportion of the tonnage at the port yielded no dues. Revenue, it was understood, was being lost through many sources, ships loading for French railways and those under Government contract being the chief. The Clerk of the Board stated that they had already lost £800 in dock dues as the result of the Admiralty's action, and Mr. J. H. Vickery, the General Manager, pointed out that the Alexandra (Newport and South Wales) Docks & Railway Company were not being subsidised by the Government but were working under a special arrangement.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

On the whole the freight markets show signs of improvement and, so far as the Plate section is concerned, the demand for tonnage extends right into December. Homewards from Argentina business can be secured at better rates than have prevailed recently. Apparently the supply of tonnage is none too good, and prompt and later boats may possibly be able to obtain the full level of 70s. from up-river ports to United Kingdom destinations. The *Rocio*, 5,400 tons, 10 per cent., has been taken up for December 15 cancelling at 67s. 6d. from up-river ports to the United Kingdom, whilst the *Trevean*, 4,500 tons, 10 per cent., has secured 70s. from San Lorenzo to the United Kingdom, with exclusions. For Plate business a small steamer has recently been conceded 84s. 6d. to Scandinavia. A fair volume of business has been done from the Northern Range, and there is a greater demand for steamers to load oats for the United Kingdom. The *Chatton*, 23,000 tons, 10 per cent., has accepted 12s. for heavy grain from the Northern Range to the United Kingdom. Slowness characterises the Eastern markets. Bombay has been able to secure tonnage to Barrow with ore at 50s., and on deadweight basis to Hull, 52s. 6d. has been accepted. The *Purley* has been fixed to load at Vladivostock for the United Kingdom at 85s., January 15 cancelling. Further tonnage might be taken up for beans from Vladivostock at 85s. to the United Kingdom. For pit-props from Newfoundland to the Bristol Channel, 185s. is offered. Quebec to Bristol has paid 155s. for 1,000 standards of deals. Bilbao to Middlesbrough has been closed at 17s. 1½d. In the outward coal market from the Tyne rates remain as firm as ever. The tonnage situation is acute. The supply of boats offering is still inadequate for the trade, and vessels of the larger class are very hard to secure. Genoa is worth 45s., and this rate may be improved upon before these lines appear in print. To Porto Ferraio, 43s. has been conceded, and Cette has paid 41s. 6d. The French Channel ports also have advanced, Rouen being done at 19s. The London rate is 9s. 6d. Blyth to Havre has paid 16s. 9d., whilst the Wear to the same French port has been done at 3d. less. At Cardiff there is likewise a scarcity of tonnage, and freights are high and rates still soaring. Representative fixtures are :—Algiers, 44 fr.; Gibraltar, 28s.; Port Said, 46s. 3d.; Alexandria, 45s.; and Genoa-Savona-Spezia-Leghorn, 40s. Partington to Genoa has paid 40s. to the *Yrsa*, whilst Liverpool to Nantes has been closed at 22s.

Glasgow.

A steady tone has prevailed in the Glasgow market during the week, and a fair amount of business has been carried through. There was a good demand for outward tonnage from Wales, and also from Scottish ports. Fixtures were concluded for Genoa at 39s.; Port Said, 45s.; Alexandria, 43s. 6d.; and the River Plate at 40s. From Scottish ports the following fixtures were reported :—Glasgow to Rouen, 1,300 tons, 18s., clean; Firth of Forth to Dieppe, 17s. 6d.; Firth of Forth to Rouen, 1,400 tons, 19s.; Glasgow to Bagnoli, 4,500 tons, 40s.; Glasgow to Genoa, 3,300 tons, 41s.; Glasgow to Dunkirk, 700 tons, 21s.; Fife port to Rouen, 1,450 tons, 19s.; Glasgow to Dieppe-Brest range (excluding Rouen), 650-750 tons, 17s. 6d.; Glasgow to Bayonne, 2,300 tons, 33 fr.; Methil to Dunkirk, 1,700 tons, 19s. 6d. In the home market the feature has been the activity in grain freights from the United States. A good deal of business was done in grain on the basis of 11s. 9d. to 12s. for the West Coast of the United Kingdom, and 12s. 3d. to 12s. 6d. to the East Coast. Tonnage was also required for France at 12s. 6d., and for Italy at 13s. 9d. There has been comparatively little doing from the River Plate though rates were firm at 67s. 6d. from San Lorenzo. In the Australian trade 85s. was reported to have been paid for new season's grain. Eastern markets were dull.

Newcastle-on-Tyne.

Though there is a most pronounced scarcity of tonnage in the local freight market, chartering has been brisk during the past week. Rates have generally shown great strength and considerable advances are to be recorded for both far and near destinations. It is worthy of note that a large quantity of tonnage is being taken up in the French coke trade. Coastwise, business is based on 9s. 3d. to London. North France commenced the week showing easiness, but rates have rallied and now stand fully 1s. in excess of those prevailing last week. Dunkirk is from 6d. to 1s. increased,

Boulogne from 3½ to 4s. 3d. Ingliot, and Rouen about 4s. dearer. The Bay is a very firm market and, though Bordeaux is unchanged at from 25s. 6d. to 26s., St. Nazaire is 4s. advanced. Rates for Mediterranean ports continue to rise, and Italian business is being done on the basis of 44s. 6d. to Genoa, from 6d. to 2s. 6d. more than last week's prices, with every prospect of further increases being recorded in the near future. The Islands are represented by 27s. 6d. to Madeira and the South Mediterranean has Oran fixed for at 33s. 6d. and Algiers done at 6d. less. Fixtures to Odense and Copenhagen are interesting. Fixtures arranged since last report include the following:—Algiers, 5,500, 33s.; Barcelona, 1,500, 38s.; Boulogne, 1,500, 17s. 3d.; 600, 18s.; 1,500, 18s. 3d.; Bordeaux, 2,500, 26s.; 2,000, 25s. 6d.; Cherbourg, 500, 16s.; Copenhagen, 1,700, 14s. 6d.; Caen, 1,000, 17s. 6d.; Cette, 2,000, 41s. 6d.; Dunkirk, 2,400, 18s.; 2,000, 19s.; Fecamp, 1,500, 18s. 3d.; Genoa, 2,500, 43s. 6d.; 4,200, 44s.; 3,000, 44s. 6d.; Havre, 900, 17s.; London, 2,000, 8s., C.T.; 1,300, 9s. 3d.; Malta, 2,700, 39s.; Marseilles, 1,700, 41s. 6d.; Madeira, 600, 27s. 6d.; Odense, 1,800, 13s. 9d; Oran, 3,000, 33s. 6d.; Port Vendres, 2,600, 45s.; Rouen, 2,500, 18s.; 1,700, 18s. 3d.; 450, 25s., coke; 2,500, 18s. 9d.; 1,600, 19s.; St. Nazaire, 3,000, 25s.; St. Vincent, 3,600, 35s. 6d.; Treport, 1,400, 18s. 6d., five voyages; Trouville, 450, 24s., coke.

Liverpool.

This market maintains a steady tone, and both outward and homeward freights current indicate that economical conditions are in owners' favour. Coal tonnage outwards, for example, is none too plentiful, and rates are tending upwards, representative values being 43s. 6d. to Alexandria, and 30s. to Genoa. Partington (Ship Canal) has again paid 15s. to Rouen, and one steamer is reported fixed at 17s. 6d. Time rates keep steady, though two fixtures indicate an easier tendency. The *Kenmore* has been fixed six months in the Transatlantic trade at 20s., but a 7,400-ton steamer in the same trade for 12 months only made 17s. Homeward conditions in the more active markets are much as they were a week ago. America is a little quieter for grain, though there is still a fair business passing. Northern Range to United Kingdom pays 12s. to 12s. 3d., and 13s. 6d. one, and 14s. two ports, West Italy, for heavy grain, while 10s. to French Atlantic, and 11s. West Italy, is offering for oats. Other American exports are dull and featureless. River Plate continues a fluctuating and uncertain market, and after reaching 70s. the rate, San Lorenzo to United Kingdom, has eased to 67s. 6d. With owners holding back, the 70s. rate is very likely to be established in view of more activity in this trade. Eastern markets are quiet but firm, and Australia now coming on may find difficulty in getting tonnage at 85s. now indicated. Indian slow, with an improving tendency, and Bombay rates slightly better. Mediterranean homewards quiet but firm. North Pacific keeps very firm, though quiet, and 100s. does not attract business. Nitrate ports hold to 80s., but later loading are quoted 2s. 6d. higher. Ore ports are busy, and getting higher rates, though no bookings to the Mersey are recorded. Sail freights are steady but quiet. Homeward rates from Australia are firmer in sympathy with Eastern steam values.

Cardiff and Swansea.

Scarcity of tonnage supplies and firmly maintained rates have been the outstanding features of the Cardiff and Swansea freight markets. Despite a comparatively moderate inquiry, rates were fully maintained, the available supplies of tonnage being insufficient to meet requirements. In fact, four new high records were created, Marseilles fixing at 51 fr. for a 2,000-ton prompt steamer, Alexandria at 45s. (500 tons delivery) for a 4,000-ton ship ready at the end of the month, Algiers at 44 fr. 2,600 tons prompt, and Port Said 46s. 3d. for a 4,400-tonner ready November 1. Representative fixtures from Cardiff were:—Barcelona, 32s. 6d.; Cadiz, 26s.; Genoa with options, 39s. (twice) and 40s. (twice); Lisbon, 22s. (400 tons delivery) and 23s. (350 tons delivery); Alexandria, 43s. 6d. and 45s.; Marseilles, 47 fr. (twice), 51, 48 and 50 fr.; Sicily, 40s.; Gibraltar, 28s. (twice); and Port Said, 45s. (twice) and 46s. 3d. Bay and Coasting business was quiet with rates, owing to a lack of orders, on the easy side, Boulogne fixing at 17s.; Caen, 15s.; Honfleur, 15s.; Havre, 14s. (three); Nantes, 23 and 24 fr.; Rouen, 16s., 15s. 6d. (three) and 15s. 3d.; and St. Nazaire, 23s. The River Plate market was quiet, with the tone about steady, and business was confined to one fixture at 40s. Altogether tonnage to carry 98,550 tons was fixed to load at Cardiff or Newport last week, or 122,100 tons less than in the previous week. From Swansea, chartering was also quieter, only 48,510 tons being fixed, a decrease of 8,170 tons. Rates ruled firm for the Mediterranean, but were weaker for other directions, Marseilles fixing at 49 fr. (a new high record); Sicily, 40s. (three); Bordeaux, 28 fr.; Dieppe, 15s., 15s. 6d. and 15s. 3d.; Havre, 13s. 6d.; and Rouen, 16s. 6d., 16s. 3d., and 16s. Chartering from Port Talbot was brisk at Bayonne, 25 fr.; Dunkirk, 18s. 6d.; Huelva, 26s.; Honfleur, 15s.; Nantes, 23¼ fr. (600 tons delivery); Rouen, 15s. 6d. (twice) and 16s.; and St. Servan, 13s.

Hull.

The market has a firm tone for the Mediterranean direction, and rates are based on 41s. 6d. for Marseilles from Hull, and 42s. 6d. for Genoa or Savona from Hull. The trend of the coasting trade is stronger, and rates are based on 18s. 6d. for Rouen from Hull, 17s. 3d. to 17s. 6d. for Havre from Hull, 17s. 3d. to 17s. 6d. for Dieppe from Hull, 17s. 3d. to 17s. 6d. for Honfleur from Hull, and 17s. 3d. to 17s. 6d. for Fecamp from Hull. In the River Plate market a very firm tone is maintained, but business is momentarily quiet. In the short trades down the English coast London from Hull quotes 9s. to 9s. 6d., and London from Goole 9s. 6d. to 10s. according to size. The War Trade Department are granting licences for the shipment of cargoes to France without difficulty or delay, but very few licences are available for neutral countries, and in consequence of their almost wholesale refusal the chartering trade to Scandinavia is practically suspended.

THE COAL MARKETS.

(From Our Own Correspondent.)

Lack of tonnage has had a deterring effect upon the Cardiff coal market, and it is hardly likely that the week will witness any marked improvement. Last week chartering was decidedly of a quiet character. A number of collieries were idle, but some of these were able this week to restart. At the opening of the present week there was a plentiful supply of all classes of coal for prompt shipment. Monmouthshires appeared to be rather better stemmed. Practically there are no regular quotations.

On Monday, in large coals there was nominally no change, nor was there any notable movement in smalls. Buyers for prompt shipment were able in most instances to satisfy their needs at figures lower than those generally indicated. Inquiry was slow for practically all descriptions.

The following quotations must be considered as purely nominal:—Second Cardiff large coal, 18s. 6d. to 19s.; ordinary large steam, 18s. to 18s. 6d.; Best drys, 23s. to 24s.; best Monmouthshire Black Veins, 18s. 6d. to 19s.; Eastern Valleys (best), 17s. 6d. to 18s.; No. 3 Rhondda (large), 21s. to 22s.; small steams (best), 11s. 6d. to 12s.; and pitwood, 42s. to 43s.

North-East Coast.

The supply of tonnage likewise exercises its effect upon the Tyne coal trade, and it has to be admitted that the forward tonnage position is none too promising. For the next week or more the collieries have plenty of trade to keep them busy, and consequently they are quoting full recent figures.

As a result of representations made to the War Trade Committee, certain changes have been brought about in regard to licences for coal export. Probably the one of most importance is that dealing with bunker coal supplies to neutral steamers, and which came into effect on Tuesday last (October 19). Up to that date it had been obligatory to secure from London licences for such bunker supplies.

From Tuesday last, however, it is to the local Customs authorities that application will have to be made. Having regard to the large amount of bunkering carried on at the North-East Coast ports, it is generally admitted that this is a much-needed facility which will quicken the operation of obtaining the necessary permit.

Prices for best steam coals have shown little alteration. At the opening of the week 19s. was the direct quotation, but it was possible to do second hand business at 3d. less. Blyth seconds were steady at 17s. 6d. to 18s., whilst Tyne seconds were quiet at about 16s. 6d. There have been shipments in larger quantities of steam smalls at about 13s. 9d. for Tyne Primes, 11s. for seconds, and 11s. 6d. for Blyths. Bunker values for ordinaries are steady at about 15s. 6d., and at 16s. 6d. to 16s. 9d. for bests.

The Scottish Markets.

During last week there was an improvement in the tone of the Scottish coal market. An increased volume of business was reported, although prices did not advance to any extent. The bulk of the

business was to satisfy local demands, but, all the same, there was an improvement on the export side. Naturally enough the Scottish coal shippers are faced with the same tonnage difficulty as others, but they were fortunate in being able to secure boats for a good many voyages to Mediterranean and Bay ports.

The Glasgow market opened the week very strongly, and a considerable volume of business was put through in named ells. There was also a good demand for splints, the values of which were firmly held. In navigations, however, business was slow. West of Scotland quotations include :—Ell (best brands), 17s. 3d. to 17s. 9d. ; splints (best brands), 21s. to 24s. ; navigation, 20s. to 21s. ; steams, 15s. to 17s. 6d. In the Fifeshire section screened navigation was quoted at 20s. to 21s., first-class steams at 17s. to 18s., and third-class steams at 14s. to 15s. In Lothian coals, best steams stand at 17s. to 18s. and ordinary steams at 15s. 6d. to 16s.

London.

A moderate amount of business is reported from the London market. Merchants seem to be exercising a good deal of care in their negotiations for the purchase of house coal. It would seem that most of the merchants now have more or less satisfactory stocks in hand and, with the prevalence of mild weather, the retail trade continues somewhat quiet. Colliery quotations are nominally unaltered. Yorkshires seaborne household coals were to be had in moderate amount. Steams and manufacturing coal are, in short supply and are wanted.

Genoa.

According to reports from Genoa the coal trade is characterised by most unsatisfactory conditions. Owing to the shortage of trucks the port is badly congested, and the Harbour Board decreed that for a certain number of days each day should only count as half a day in the vessel's time. In other words, receivers were only obliged to put out 250 tons per day. In some quarters it is thought that the congestion at this port is likely to become more acute before it shows any signs of improvement. Parcels of Great Western have changed hands at 59s. and 59s. 6d. Other parcels in the port went at lower figures. In the anthracite market there is a strong inquiry. The market has been additionally strengthened owing to the fact that the contract for supply of over 15,000 tons of American anthracite have fallen through. A strong demand still prevails for foundry coke.

COMPANY REPORTS.

Britain Steamship Company, Ltd.—Interim dividend of 10s. per share, free of tax.

Furness, Withy & Co., Ltd.—Dividend of 2½ per cent., or 6d. per share, for the past quarter.

General Steam Navigation Company, Ltd.—Interim dividend of 3 per cent., less income-tax, on the ordinary shares.

Parsons Marine Steam Turbine Company, Ltd.—Dividend of 13 per cent., less tax, making 25 per cent. for the year.

Australian Steamships, Ltd.—Interim dividend for the half-year ended June 30 at the rate of 10 per cent. per annum.

Dublin Steam Packet Company, Ltd.—Dividend at the rate of 5 per cent. per annum, less income-tax, on the cumulative preference stock, and at the rate of 4 per cent. per annum, free of income-tax, on the ordinary stock for the half-year ended August 31.

Commonwealth & Dominion Line, Ltd.—The directors recommend a bonus of 2 per cent., free of income-tax, on the ordinary shares, making 8 per cent. for the year, placing £10,000 to a staff superannuation fund and carrying £48,918 forward.

Howard Smith, Ltd.—Interim dividend for the half-year ended June 30 at the rate of 6 per cent. on the cumulative preference shares and 8 per cent. per annum on the ordinary shares on the amounts paid up thereon.

Reiherstieg Shipbuilding Company.—As we have already announced this company is passing its dividend. The report now to hand offers no explanation other than that existing war conditions forbid the company giving details. The number of workmen has been reduced from about 3,000 to half this number. The net profit was £12,684, the whole amount going towards depreciation and other charges. The sum of £6,360 appears as war charges and debenture interest stands at about the same figure as last year. Only £12,685 has been set aside for depreciation compared with £20,800 last year. The revenue fell from £124,250 last year to £93,995.

Hamburg Cuxhavener Fischdampfer A.G. "Alte Liebe."—The report summarised in our issue of October 7, page 298, was duly accepted by the ordinary general meeting and the directors were voted a special remuneration of £350. A proposal to allow expenses and a fixed payment of £350 per annum in addition to the share in net prescribed by the articles, gave rise to a long discussion. The proposal was carried (in face of an amendment to base directors' remuneration entirely on net profits) by 315 to 65, but as a quorum was not present an extraordinary general meeting is to be called. All the retiring directors were re-elected. Apparently the Board does not anticipate getting much out of net profits in future.

NEWS PARAGRAPHS.

Union Marine Insurance Company.—The agency of the Union Marine Insurance Company for the United States, hitherto held by F. Herrmann & Co., has been terminated, and the marine business is now being transacted at the New York office of the Phœnix Assurance Company.

The N.E. Coast Institution.—The Secretary of the North-East Coast Institution of Engineers and Shipbuilders, Bolbec Hall, Newcastle-on-Tyne, has issued an appeal for more support. The membership of the Institution, he says, is about 1,200, whereas a conservative estimate of the total numbers of competent engineers and shipbuilders of the district alone would be 4,000

Admiralty Badge for Officers in Transports.—The Admiralty have decided upon a cap badge for the use of officers of transports. It is anticipated that supplies of the badge will be obtainable from naval outfitters very shortly. The design has a circular centre with the lettering R.N.—Transport and an anchor in gold inset. The crown which figures above and the laurel leaves on each side of the centre are in conformity with the recognised Admiralty patterns.

Panama Canal. Tonnage measurements.—The Marine Department of the Board of Trade has informed the Chamber of Shipping of the United Kingdom that it understands from a communication which it has received through the Foreign Office that it is the intention of the Panama Canal authorities to accept in future the net tonnage given in the certificates of registry or other national papers of British vessels, as equivalent to American net tonnage, for the purposes of calculating the dues payable by vessels passing through the Canal, and that it will not be necessary, therefore, for British vessels using the Canal to be furnished with a certificate of their measurement under United States rules of measurement in addition to their Panama Canal certificate.

U.S. Submarine's Speed.—Extraordinary difficulties are being encountered by the United States Navy with the surface propulsion of submarines and so far no way has been found of overcoming the cylinder troubles met with in all cases where Diesel engines are used. It is commonly reported that the Department is considering the use of turbine machinery for surface propulsion in order that greater reliance may be placed on this class of craft. Recently the speed requirements of submarines were increased and the results so far have been disappointing. Four boats have failed to pass the preliminary speed tests and have been compelled to return to the shipyard for modifications in their propelling machinery, which consists of Diesels of a modified design based on the German Nurnburg type.

Cramp Shipbuilding.—We take the following from the *Wall Street Journal* :—"During the current year a large amount of Cramp shipbuilding stock has been accumulated by New York interests, in view of the fact that the company has averaged 12 per cent. annually on the stock over the past two years, and indications are that more than 25 per cent. will be earned in the current fiscal year, certain stockholders will urge the resumption of dividends, beginning early next year. With present earnings, it is suggested that the company could easily pay 6 per cent. annually, and there would then remain a large surplus to take care of new construction and increased business. Cramp shipbuilding will figure prominently in the construction of warships for the Government, and an enlargement of the plants has been made necessary. It is also expected to close additional large contracts for the construction of merchant ships."

British Ships Sunk.—Up to the end of last week the number of British merchant ships reported sunk by submarines was 183. Of these, 93 were reported destroyed by torpedoes.

Trawlers from America.—The American Shipbuilding Company, two of whose yards are situated on the Great Lakes, is at present negotiating for contracts to build trawlers in order to replace those that have been lost by British firms during the war. Several tenders have already been submitted, while designs and estimates have been prepared for the construction of a large number of vessels.

Hull and the Foreign Cattle Traffic.—There is a possibility of Hull competing with the west coast in the traffic in foreign cattle, and a movement has been started to see if Hull as an excellent distributing centre can obtain a share in this important trade. It is suggested that that portion of the Western Reservation may be utilised for a landing stage for this trade. A special Corporation Committee has been appointed to deal with this matter.

New Japanese Steamship Service.—His Majesty's Commercial Attaché at Yokohama (Mr. E. F. Crowe, C.M.G.) reports that the Formosan Government-General has consulted with the Osaka Shosen Kaisha in regard to the establishment of a new subsidised steamship service from Formosa to Java ports, via Swatow, Amoy, Manila, Borneo and Celebes. No decision, however, has yet been reached. According to a local press announcement, says the *Board of Trade Journal*, the service would be a monthly one, maintained by two steamers of over 2,000 tons each.

Morgan Combine's Oil Burners.—The International Mercantile Marine Company has decided to convert the steamers *Kroonland* and *Finland*, of 22,000 tons each, into oil-burners, during November and December. This will not interfere with the scheduled sailings. The alterations are to be made by the Robin's Dry Dock & Repairs Company, at an estimated cost of £9,500 each. It is expected that the adoption of the new system will result in a saving of £1,800 for fuel, and £700 for wages and food on each round voyage, while the abolition of coal bunkers will permit of the carrying of 1,500 additional tons of cargo. Both vessels are also to be equipped with new refrigerating machinery, which will cost £5,000.

Shipping in Parliament.—The President of the Board of Trade states that the whole question of ocean freights is closely engaging the attention of the Government. He says that there are grave difficulties in the way of State interference with the freight market, for which the Government is anxiously endeavouring to find solutions which will not do more harm than good. Mr. Runciman intimates that he does not think it would be desirable to publish any figures at present in regard to the Government War Risks Insurance scheme. Any reports of large profits, he says, can be disregarded.

Exportation of Nautical Instruments.—In connection with the Order in Council issued on Tuesday by virtue of which the exportation of "chronometers and all kinds of nautical instruments" and "Compasses for ships, and parts thereof, including fittings, such as binnacles," is prohibited to all destinations abroad other than British Possessions and Protectorates, the Board of Trade give notice that in future firms in this country will be required to obtain the approval of the Admiralty before accepting orders for such goods from firms in foreign countries, and that applications for licences to export such goods must be accompanied by the order issued to the firm by the Admiralty permitting them to take the work in hand.

The Panama Canal Slides.—Turner, Davidson & Co., Ltd., are advised from Panama that the great delay in clearing away the slide is owing to the fact that the slide occurred at a point in the Culebra Cut between the dredging fleet and their dumping ground in Gatun Lake, about 5 miles distant. This means that the dredgers have had to cut their way through the slide, dumping their spoil in the Channel behind them until they can get on the same side of the slide as their dumping ground. Then they have to dig back through the spoil, which they have already dumped in the channel. Of course, this makes double work and delay. When this slide is finally cleared away, it is believed that the conditions will be greatly and permanently improved. Meantime, all indications point to the Canal being closed until the end of the year. Latest cables announce that the United States Government do not wish vessels to remain on the chance of the Canal being open by November 1. Unofficial advices indicate no re-opening at the earliest for 60 days.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF LAUNCHES.

Date of Launch.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions. L. × B. × D.	Propelling Machinery and Builders of Machinery.	Remarks.
	Frida, ss.	Copenhagen owner	Unterweser Yard	210′ × 30′ × 18′..	700 i.h.p.	D.w. cap. 1,500 tons.
Oct. 7	**Montezuma**, t.s.s. (pass. and cargo)	Elder, Dempster & Co. Liverpool	Ayrshire Dockyard Co., Irvine	435′ × 57′ × 27′..	Diesel oil engines (Burmeister & Wain Co., Glasgow)	5,500 tons.
Oct. 7	**Staro**, ss. (cargo)	J. E. Stang, Christiania, Norway	A.S. Sorlandets Skibsbyggeri, Fevig, Norway.	265′ 42′ 20′	Tr. Exp. 18, 29½, 50 36 (A.S. Fredriksstad mek. Verksted, Norway.)	D.w. cap. 3,100 tons.
Oct. 9	**Honduras**, ss. (meat carrier).	P. Jebsen, Tonsberg, Norway.	A.S. Fredriksstad mek. Verksted, Norway.	245′ 21′25′.	Tr. Exp. 20½, 33, 56 36 (A.S. Fredriksstad mek. Verksted, Norway.)	D.w. cap. 1,720 tons.
Oct. 9	**Sir David Hunter** (tug)	Union Government of South Africa	Ferguson Bros., Port Glasgow	116′ × 25′ × 14′..	Triple 6-cyl. 13½, 21½, 36, 524 (Ferguson Bros.)	—
Oct. 12	**A. W. Stewart**, s.s. (cargo)	Canadian Steamship Co., Montreal	John Cran & Co., Leith ..	110′ × 26′ × 14′..	900 i.h.p. John Cran & Co.	-
Oct. 12	**Saint Hugo**, s.s. (cargo).	Rankin, Gilmour & Co., Liverpool.	Russell & Co., Port Glasgow	405′ 52′2″ 27½′	Tr. Exp. 26 42, 70 48 J. G. Kincaid & Co.	5,000 tons gross.
Oct. 14	**Queen Mary**, s.s. (cargo).	T. Dunlop & Son, Glasgow.	Russell & Co., Port Glasgow	423′ 56′ 31½′	Tr. Exp. 27, 45, 74 51 Rankin & Blackmore	5,700 tons gross.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF TRIAL TRIPS.

Date of Trial Trip.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions. L. × B. × D.	Propelling Machinery and Builders of Machinery.	Remarks.
Oct. 6	**Governor**, s.s. (pass. and cargo)	T. & J. Harrison, Liverpool	D. & W. Henderson, Glasgow	410′ × 52½′ × 30½′	Triple 6-cyl. 25″, 40½, 70 × 48 (D. & W. Henderson)	5,500 tons.
Oct. 6	**Ilston**, ss. (cargo) ..	Swansea Steamers, Ltd.	Dunlop, Bremner & Co., Port Glasgow	—	Dunlop, Bremner & Co... ..	2,330 tons.
Oct. 14	**Iceland**, ss. (cargo)		Napier & Miller, Glasgow ..	339½′ × 50¾′ × 18′	Tr. Exp., 25, 41, 68 45 D. Rowan & Co.	-
Oct. 14	**Murillo**, t.s. (pass. and cargo)	Lamport & Holt, Ltd., Liverpool	Russell & Co., Port Glasgow	456′ × 56′ × 39′..	Belfast, Quad. Exp. 4,000 i.h.p. Harland & Wolff, Ltd.	Large refrigerated capacity.
Oct. 15	**Mandala**, t.s. (pass. and cargo)	British India Steam Nav. Co.	Barclay, Curle & Co., Glasgow	450′ × 58½′ × 32½′	Tr. Exp. 6-cyl. 21, 35½, 61 45 Barclay, Curle & Co.	

OFFICIAL NOTICES AND SHIPS FOR SALE.

FOR SALE.

(PARTICULARS NOT GUARANTEED)

Folio 9047. New Steamer now building. About 7,900 tons d.w. on about 22 ft. 3 in. draught. Single Deck. Long Bridge. Triple Engines. Three Single-ended Boilers. Estimated speed about 10 knots on about 26 tons.

Folio 9127.—Built 1910. Surveyed 1914. About 7,450 tons d.w. on about 23 ft. 2 in. draught. Single Deck. Triple Engines. Three Single-ended Boilers. Speed about 11 knots on about 28 tons. Early delivery.

Folio 8822. Built 1900. Surveyed 1913. About 6,450 tons d.w. on about 22 ft. 9 in. draught. Single Deck. Triple Engines. Two Single-ended Boilers. Speed about 9 knots on about 20 tons.

Folio 7884. Built 1899. Surveyed 1912. About 5,800 tons d.w. on about 21 ft. 9 in. draught. Single Deck. Triple Engines. Two Single-ended Boilers. Speed about 9 3/4 knots on about 18 tons.

Folio 8384.—Built 1893. Surveyed 1915. About 4,150 tons d.w. on about 22 ft. draught. Part awning Deck. Triple Engines. Two Single-ended Boilers. Speed about 9 knots on about 15 tons.

Folio 8263. Built 1901. About [illegible] tons d.w. on about 18 ft. 3 in. draught. Single Deck. Triple Engines. Two Single-ended Boilers. Speed about 8½ knots on about 14 tons.

For further Particulars, Plans, Prices, &c., apply to:

THOS. PINKNEY & SONS,
Sunderland.

Telegraphic Address—"Spardeck."

THE owner of British Patent No. 22,963 of 1912, entitled "Improvements in Apparatus for Propelling, Elevating and Supporting Ships, Boats, Submarines and the like Vessels," is desirous of disposing of the patent or entering into working arrangements under licence or otherwise with firms likely to be interested in the same.

A copy of the patent specification and full particulars can be obtained from and offers for transmission to the owner made to MARKS & CLERK, 57 and 58, Lincoln's Inn Fields, London, W.C.

OFFICIAL NOTICES AND SHIPS FOR SALE.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday.

All advertisements should be addressed to

Shipbuilding and Shipping Record,
Queen Anne's Chambers,
Westminster, London, S.W.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Angàclikà, ss. (well dk.), (ex *Ilsenstein*, ex *Ardlui*, ex *Beaton*)	[illegible] gr. 2,301 net. 5,206 dw.	346′ × 45′ × 20½′ (21′)	G. Vergottis, Syra, to buyers not stated	Schlesinger Davis & Co., Newcastle (1890)	23½, 42, 64 × 45 (N.E. Mar. Eng. Co., Newcastle)	Price about £40,000. Changed hands in 1906 for about £12,750.
Asama Maru, ss. (ex *Asama*)	1,194 gr. 2,786 net.	280′ × 40′ 29′	Goshi Kaisha Yamamoto Kisen Shokai, Dairen, to buyers not stated	Palmers Co. Newcastle (1897)	24½, 41, 70 × 45 (Palmers Co.)	Price about £4,000
Atacama, s.s.	1,1[illegible] gr. 1,068 net.	224′ × 34½′ × 20	Acties Atacama (P. Wiberg), Christiania, to buyers not stated	R. & J. Evan & Co. Liverpool (1890)		Price about £7,500.
Delagoa, ss. (shelter dk.)	3,[illegible]42 gr. 2,197 net. 7,500 dw.	[illegible]60′ × [illegible]2′ 23½	O. Wallenburg (Det Ostasiatiske Kompagni), Stockholm, to SS. Co. Orient, Copenhagen	W. Dobson & Co., Newcastle (1914)	25, 41, 69 × 48 (Richardsons, Westgarth & Co., Hartlepool)	
Den of Crombie, ss. (spar dk.)	4,[illegible]43 gr. 3,128 net. 8,150 d.w.	400′ × 52′ × 19¼ (25′)	Barrie SS. Co. (C. Barrie & Sons), Dundee, to Furness, Withy & Co., Liverpool	Chas. Connell & Co., Glasgow (1897)	27, 44, 73 × 48 (D. Rowan & Co., Glasgow)	Price about £[illegible]
Den of Kelly, ss. (ex *Donhanna*) renamed **Snowdon Range**	4,662 gr. [illegible]288 net.	390′ × 52½′ × 26½′	Barrie SS. Co. (C. Barrie & Sons), Dundee, to British buyers	Scotts' S.B. & Eng. Co., Greenock (1906)	26½, 44, 72 × 48 (Scotts' S.B. & Eng. Co., Greenock)	
Eleni Bistis, ss. (ex *Hindoo*)	3,267 gr. 2,089 net. 5,750 dw.	33[illegible]′ × 49′ × 22⅝′ (21½′)	M. A. Bistis, Andros, to Norwegian buyers	Swan, Hunter & Wigham Richardson, Newcastle (1906)	23, 38, 61 × 40 (N.E. Mar. Eng. Co., Newcastle)	Price about £72,500.
Fairford, ss. (ex *Eaglemead*)	367 gr. 148 net 440 dw.	142′ × [illegible]′ × 19′	Ford SS. Co. (Mann, Macneal & Co.), Glasgow, to T. M. Collier, Bray & Co., Wicklow	J. Fullerton & Co., Paisley (1891)	20, 40, 27 (Muir & Houston, Glasgow)	
Good Hope, ss. (turret dk.)	3,618 gr. 2,308 net. 6,[illegible] d.w.	[illegible]40′ × 50[illegible]′ × 22′ (20′)	The World SS. Co. (G. T. Symons & Co.), London, to British buyers	W. Doxford & Sons, Sunderland (1903)	26, 42, 68 × 42 (W. Doxford & Sons)	Price about £58,000.
Hercules, ss. (spar dk.)	3,789 gr. 2,439 net.	339 × 48′ × 17½′	Acties Dmpsk. Hercules (J. Christensen), Bergen, to L. Kloster Stavanger, Norway	Osbourne Graham & Co., Sunderland (1903)	21, 33, 66 × 48 (G. Clark, Ltd., Sunderland)	Price about £[illegible]
Moresby, ss. (ex *Jacob Christensen*)	1,763 gr. 1,338 net.	260[illegible] × [illegible] × 24′	Burns, Philp & Co., Sydney, N.S.W., to Moresby SS. Co. (Moller & Co.), London	R. Dixon & Co., Middlesbrough (1881)	[illegible] × [illegible] (T. Richardson & Sons, Hartlepool)	
Northern, ss. (shelter dk.)	4,731 gr. 2,912 net. 8,500 dw.	388′ × [illegible]′ × 26′	Century SS. Co. (Harris & Dixon, Ltd.), London, to J. Mathias & Sons, Aberystwith	J. L. Thompson & Sons, Sunderland (1912)	27½, 44½, 74 × 48 (J. Dickinson & Sons, Sunderland)	
Ottoland, ss. (ex *Mansfield*)	1,574 gr. [illegible]42 net.	270′ × [illegible]′ × [illegible]	Stoomv. Maats. Nederlandsche Lloyd, Rotterdam, to E. Stensrud, Skien, Norway	Naamlooze Vennootschap Scheepswerf, Alblasserdam (1901)	20, 33, 54⅝ × 36 (Blair & Co., Stockton)	Price about 750,000 kr.
Potsdam, t.ss. (shelter dk.)	12,522 gr. 7,975 net.	550′ × 62′ × 34′	Nederl. Amerika Stoomv. Maats Holland Amerika Lijn, Rotterdam, to Swedish Nord Amerika Line, Gothenburg	Blohm & Voss, Hamburg (1900)	4 cylinders, 27½, 56½, 56 × 5[illegible] (Blohm & Voss)	Price about £[illegible]
Ramstad, ss. (ex *Nidaa*)	2,761 gr. 1,772 net 4,750 dw.	315′ × 46½′ × 21′ (20′)	Grefstad & Herlofson, Grimstad, Norway, to Lauritz Kloster, Stavanger	Clyde S.B. & I. Co., Port Glasgow (1906)	23, 38, 61 × 42 (Clyde S.B. & I. Co.)	Price about £68,000. Changed hands in 1914 for about £41,500.
Reidar, ss. (turret dk.)	3,574 gr. 2,276 net.	34[illegible]′ × [illegible]′ 22½′	Act. Disp. Reidar (Wm. Arnesen & Amundsen), Fredrikshald, to Oscar Larsen, Jervell & Co., A/S Aalesund	W. Doxford & Sons, Sunderland (1914)	26, 42, 68 × 42 (W. Doxford & Sons)	Price about 1,500,000 kr.
Ronald, ss. (spar dk.) (ex *Estrella*, ex *Carrigg*)	3,021 gr. 1,835 net.	3[illegible]′ × 42′ 17½′	Akties. Rimul (D. Steen), Christiania, to O. Eskildsen	Sir Raylton Dixon & Co., Middlesbrough (1898)	25, 39, 7[illegible] × 42 (N.E. Marine Eng. Co., Sunderland)	Price about £[illegible] Sold in [illegible], [illegible] about £[illegible]
Striv, s.b. ...	1,863 gr. 1,611 net. 2,[illegible] dw.	270′ × [illegible]′ × 22½′ (20′)	Aktiebolaget Striv (L. Jacobsen), Sarpsborg, Norway, to Liver[illegible]	Forges et Chantiers de la Mediterranée, Havre (1897)		Price about £12,000. Changed hands in October, 1912, for about £[illegible]

LLOYD'S REGISTER SHIPBUILDING RETURNS FOR THE QUARTER ENDED SEPTEMBER 30, 1915.

In consequence of the war it is not possible at present to publish the usual information regarding the shipbuilding industry throughout the world. The present returns are therefore confined to merchant vessels in course of construction in the United Kingdom.

1. Merchant Vessels under Construction.

The returns compiled by Lloyd's Register of Shipping, which only take into account vessels of 100 tons and upwards the construction of which has actually begun, show that, excluding warships, there were 432 vessels of 1,536,177 tons gross under construction in the United Kingdom at the close of the quarter ended September 30, 1915. The particulars of the vessels in question are as follows, similar details being given for the last quarter and for September 30, 1914, for the purpose of comparison:—

Description	June 30, 1915. No.	June 30, 1915. Gross tonnage.	Sept. 30, 1914. No.	Sept. 30, 1914. Gross tonnage.	Sept. 30, 1915. No.	Sept. 30, 1915. Gross tonnage.
Steamers						
Steel	420	1,505,025	464	1,505,025	469	1,718,585
Iron	—	—	—	—	—	—
Wood and composite	—	—	—	—	1	145
Total	420	1,505,025	464	1,505,025	470	1,718,730
Sailing Vessels						
Steel	—	—	6	1,450	14	1,470
Iron	—	—	—	—	1	250
Wood and composite	1	100	2	450	1	100
Total	1	100	8	1,900	16	4,820
Total Steamers and Sailing Vessels	421	1,505,125	472	1,506,925	486	1,723,550

The tonnage now under construction in the United Kingdom is nearly 30,000 tons more than that which was in hand at the end of last quarter, but about 187,000 tons less than the tonnage building 12 months ago. It will be understood that the rate of progress in merchant ship construction is very much reduced in the present circumstances and that the immediate output will be considerably less than that which would be obtained under normal conditions.

Of the merchant vessels being built in the United Kingdom at the end of September, 376 of 1,248,063 tons are under the inspection of the Surveyors of Lloyd's Register with a view to classification by this society.

2. Work in Hand in Principal Districts.

The following table gives the total figures for vessels now under construction in some of the principal shipbuilding districts of the country, as compared with those for the last quarter and 12 months ago. Each district, of course, includes places in the neighbourhood of the port after which it is named:—

District	Description	Sept. 30, 1915. No.	Sept. 30, 1915. Gross tonnage.	June 30, 1915. No.	June 30, 1915. Gross tonnage.	Sept. 30, 1914. No.	Sept. 30, 1914. Gross tonnage.
Barrow, Maryport and Workington	Steam	4	2,470	3	1,885	4	2,685
	Sail	—	—	—	—	—	—
	Total	4	2,470	3	1,885	4	2,685
Belfast	Steam	23	258,100	24	260,700	28	351,350
	Sail	—	—	—	—	—	—
	Total	23	258,100	24	260,700	28	351,350
Glasgow	Steam	77	347,133	80	353,173	93	408,118
	Sail	1	100	2	750	7	2,000
	Total	78	347,533	82	353,923	100	410,118
Greenock	Steam	48	224,814	46	209,004	46	203,880
	Sail	—	—	—	—	—	—
	Total	48	224,814	46	209,004	46	203,880
Hartlepool and Whitby	Steam	15	73,530	15	71,350	17	79,880
	Sail	—	—	—	—	—	—
	Total	15	73,530	15	71,350	17	79,880
Hull	Steam	52	33,214	50	26,032	51	31,508
	Sail	—	—	—	—	—	—
	Total	52	33,214	50	26,032	51	31,508
Liverpool	Steam	9	23,965	11	24,065	14	35,304
	Sail	—	—	—	—	—	—
	Total	9	23,965	11	24,065	14	35,304
Middlesbro and Stockton	Steam	30	85,855	31	83,165	35	68,290
	Sail	—	—	—	—	4	968
	Total	30	85,855	31	83,165	39	69,258
Newcastle	Steam	57	263,421	61	270,684	67	302,831
	Sail	1	170	1	170	—	—
	Total	58	263,591	62	270,854	67	302,831
Sunderland	Steam	45	176,885	43	162,836	51	191,064
	Sail	—	—	—	—	—	—
	Total	45	176,885	43	162,836	51	191,064

3.—Size of Vessels under Construction.

The following table shows the vessels under construction in the United Kingdom classified according to gross tonnage:—

Gross Tonnage.	Number. Steam.	Number. Sail.	Gross Tonnage.	Number. Steam.	Number. Sail.
100 and under 1,000 tons	47	—	100 and under 1,000 tons	1	—
1,000 „ 2,000 „	20	—	1,000 „ 2,000 „	4	—
2,000 „ 3,000 „	10	—	2,000 „ 3,000 „	9	—
3,000 „ 4,000 „	27	—	3,000 „ 4,000 „	1	—
4,000 „ 5,000 „	1	—	4,000 „ 5,000 „	1	—
5,000 „ 6,000 „	6	—	5,000 „ 6,000 „	1	—
6,000 „ 7,000 „	2	—	6,000 „ 7,000 „	1	—
7,000 „ 8,000 „	2	—	7,000 „ 8,000 „	—	—
8,000 „ 9,000 „	2	—	8,000 „ 9,000 „	—	—
9,000 „ 10,000 „	1	—	9,000 „ 10,000 „	—	—
10,000 „ 11,000 „	1	—	10,000 „ 11,000 „	—	—
11,000 „ 12,000 „	1	—	11,000 „ 12,000 „	—	—
12,000 „ 13,000 „	—	—	12,000 „ 13,000 „	—	—
13,000 „ 14,000 „	—	—	13,000 „ 14,000 „	—	—
14,000 „ 15,000 „	—	—	14,000 „ 15,000 „	—	—
15,000 „ 16,000 „	—	—	15,000 „ 16,000 „	—	—
16,000 „ 17,000 „	—	—	16,000 „ 17,000 „	—	—
17,000 „ 18,000 „	—	—	17,000 „ 18,000 „	—	—
18,000 „ 19,000 „	—	—	18,000 „ 19,000 „	—	—
19,000 „ 20,000 „	—	—	19,000 „ 20,000 „	—	—
20,000 „ 21,000 „	—	—	20,000 „ 21,000 „	—	—
21,000 „ 22,000 „	—	—	21,000 „ 22,000 „	—	—
22,000 „ 23,000 „	—	—	22,000 „ 23,000 „	—	—
23,000 „ 24,000 „	—	—	23,000 „ 24,000 „	—	—
24,000 „ 25,000 „	—	—	24,000 „ 25,000 „	—	—
25,000 „ 26,000 „	—	—	25,000 „ 26,000 „	—	—
26,000 „ 27,000 „	—	—	26,000 „ 27,000 „	—	—
27,000 „ 28,000 „	—	—	27,000 „ 28,000 „	—	—
28,000 „ 29,000 „	—	—	28,000 „ 29,000 „	—	—
29,000 „ 30,000 „	—	—	29,000 „ 30,000 „	—	—
30,000 „ 31,000 „	—	—	30,000 „ 31,000 „	—	—
31,000 „ 32,000 „	—	—	31,000 „ 32,000 „	—	—
32,000 „ 33,000 „	—	—	32,000 „ 33,000 „	—	—
33,000 „ 34,000 „	—	—	33,000 „ 34,000 „	—	—
34,000 „ 35,000 „	—	—	34,000 „ 35,000 „	—	—
35,000 „ 36,000 „	—	—	35,000 „ 36,000 „	—	—
36,000 „ 37,000 „	—	—	36,000 „ 37,000 „	—	—
37,000 „ 38,000 „	—	—	37,000 „ 38,000 „	—	—
38,000 „ 39,000 „	—	—	38,000 „ 39,000 „	—	—
39,000 „ 40,000 „	—	—	39,000 „ 40,000 „	—	—
40,000 tons and upwards	—	—	40,000 tons and upwards	1	—
Total	429	3	Total	429	3

* Vessels of less than 100 tons are not included in Lloyd's Register Shipbuilding Returns

4. Other Details.

The following details concerning the shipbuilding work of the United Kingdom during the past three months, may be added:—

During Quarter ended September 30, 1915.	Steam. No.	Steam. Gross tonnage.	Sail. No.	Sail. Gross tonnage.
Vessels commenced	71	118,375	—	—
Vessels launched	84	145,814	2	640

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF MARINE CASUALTIES

(including losses of merchantmen incidental to the war).

Vessel	Gross Tonnage	Owners, Builders and Year Built	Casualty.
Highland Warrior, s	7,18	Nelson S.N. Co., London. Russell & Co., Port Glasgow (1911)	Ashore near Comrat. Oct. 11. Driven further ashore. Position worse. Heavy weather. Oct. 12. Aground whole length. Forepart at No. 2 hold gone. Shell plating bulkhead gone. Heavy buckling aft engine room. Oct. 14. Aground. Ship ready to break up next gale. Oct. 15. Pinshot condition. Cargo. Heavy seas breaking over ship.
Amiral Hamelin	5,054	Chargeurs Reunis, Havre. Forges et Chantiers de la Mediterranee (1901)	Oct. 1.: Sunk by submarine in Mediterranean.
Lackawanna,	7,015	Belmont A. Cornelius, Buffalo, U.S.A. Cleveland S.B. Co., Cleveland, Ohio (1888)	Ashore on Gull Island Reef, Lake Michigan. Sept. 28. In bad condition. Bow high on shoal and stern low in water. Considerably damaged by heavy seas and broken.
Gutrune,	4,060	Hamburg-Sud Amerika D.G., Hamburg. Irvine's S.B. & D.D. Co., W. Hartlepool (1906)	Oct. 12. Torpedoed by British submarine in Baltic.
Halizones,	5,097	British & S. American S.N. Co. (R. P. Houston & Co.), Liverpool. R. Duncan & Co., Port Glasgow (1902)	Oct. 12. Sunk. Crew saved.
Fexelstroom, ss.	1,691	Hollandsche Stoomb. Maats. Amsterdam Maats. Fyenoord, Rotterdam (1914).	Oct. . Bound for Amsterdam. Struck mine off Langeoog Island, Ems. Crew saved.
Norrbotten, ss.	8,011	Rederi Aktieb. Lulea-Ofoten (P. A. Wehtje), Stockholm. Hawthorn, Leslie & Co. (1912).	Oct. 11. Bound Narvik for Philadelphia with iron ore. Feared lost off Canadian coast with all hands.
Vittoria, ss.	2,817	Scholefield S.S. Co. (H. Scholefield & Son), Newcastle. Richardson, Duck & Co., Stockton (1907).	Oct. 12. Bows badly damaged by collision with [illegible] vessel.
Director Reppenhagen, ss.	1,683	Neue Dampfer Co. A.G., Stettin. A.G. "Vulcan," Stettin (1895).	Oct. 12. Torpedoed in Baltic.
Nicomedia, ss.	1,291	Hamburg-Amerika Line, Hamburg. W. Gray & Co., W. Hartlepool (1901).	Oct. 12. Laden with ore. Sunk off Oland, Sweden, by British submarine.
James B. Neilson	2,234	Pittsburgh S.S. Co., Duluth, U.S.A. American Steel Barge Co., Superior, Wis. (1892)	Oct. 13: Foundered off Eagle Harbour, Michigan.
Walter Leonhardt, ss.	1,251	Leonhardt & Blumberg, Hamburg. Schultz & Henry Koch, Lubeck (1902)	Oct. 13: Destroyed by British submarine off Oland, Sweden.
Erna, ss.	484	Akt. Jelölinjen (Rich. Peterson), Christiania. Germaniawerft, Kiel (1884).	Oct. 14. Ashore at Ryvingen, near Mandal, Norway, total wreck.
Graywood, wood ss.	915	Graywood S.S. Co. (G. S. Beadle), San Francisco. H.D. Bendixsen S.B. Co., Eureka, Cal. (1904).	Oct. 20. Sunk in heavy weather near Puget Sound.
Sainte Marguerite, ss.	2,780	Daher & Cie., Marseilles. Atel. & Chantiers de France, Dunkirk (1913).	Oct. 15: Torpedoed in the Aegean Sea.
Babylon, ss.	2,489	Deutsche Levante Linie, Hamburg. Sir Raylton Dixon & Co., Middlesbrough.	Oct. 11: Sunk by British steamer near Oland, Sweden.
Pernambuco, ss.	1,788	Hamburg-Sud Amerik. D.G., Hamburg. Blohm & Voss, Hamburg (1897).	Oct. 19: Torpedoed in Baltic by British submarine.
Soderhamn, ss.	1,[illegible]	H.M. Gebrueder Hamburg, Helsingors Maskbyggeri, Elsinore (1899).	Oct. 19: Torpedoed in Baltic by British submarine.
Dalälfven, ss.	1,046	Baltische Reed. Gesellsch. m.b.H., Hamburg. Flensburger Schiffsb. Ges., Flensburg (1910).	Oct. 19: Torpedoed in Baltic by British submarine.
Germania, ss.	1,[illegible]	W. Kunstmann, Swinemunde, Germany. W. Doxford & Sons, Sunderland (1886)	Oct. 19. Laden with ore. Torpedoed in Baltic by British submarine.
Johannes Russ, ss.	1,751	Ernst Russ, Hamburg. Akt. Ges. "Neptun," Rostock (1903)	Oct. 20: Torpedoed in Baltic by British submarine.
Lulea, ss.	2,239	L. Possehl & Co., Lübeck. A. Stephen & Sons, Glasgow (1889)	Oct. 20: Torpedoed in Baltic by British submarine.
Friedrich Arp, ss.	1,612	H. Friedr. C. Arp (S. Olsen & A. Thuersen), Hamburg. Akt. Ges. "Neptun," Rostock (1907)	Oct. 20: Torpedoed in Baltic by British submarine.
Gertrude, ss.	1,618	William Sprague, Stettin. Nuske & Co., Stettin (1901)	Oct. 20. Torpedoed in Baltic by British submarine.
Pyrgos, ss.	4,888	Deutsche Levante Linie, Hamburg. Flensburger Schiffsb. Ges., Flensburg (1906).	Oct. 20. Torpedoed in Baltic by British submarine.
Svionia, ss.	1,[illegible]	W. Kunstmann, Stettin. J. Readhead & Sons, S. Shields (1895).	Oct. 20. Torpedoed in Baltic by British submarine.

ORDERS PLACED.

The G. Seebeck A.G. yard, Geestemunde has received an order for two trawlers from the Norddeutschen Hochseefischerei A.G.

The Nederland Company has placed an order with the Nederl. Scheepsbouw Maats. (Amsterdam) for another cargo boat of 6,600 gross tons register and 10,000 tons deadweight as sister ship to the steamship *Borneo*.

The Swedish Rederiaktiebolag Svea has ordered from the Oscarshamn Mek. Verkstad two cargo and passenger boats for Stockholm-Lü eck service. The vessels are to be about 223 by 36 ft., to accommodate 100 first and second-class passengers and to be capable of 14 knots.

The Texas Oil Company has placed an additional order with the Fore River Shipbuilding Company, Quincy, Mass., for two bulk oil-carrying steamers of 10,000 tons carrying capacity. The new tankers are to be about 450 ft. long. The Fore River Company has two tankers now under construction for the same company.

The contract for the construction of a new United States Coast and Geodetic Survey vessel *Surveyor* has been awarded by the Secretary of Commerce to the Manitowoc Shipbuilding & Dry Dock Company, Manitowoc, Wis. The contract price is $189,000 for the bare hull and machinery, but the ultimate cost of the vessel fully equipped will be $220,000. Particulars of the *Surveyor* were given in *Shipbuilding and Shipping Record* of September 30, page 281. Delivery is to be made within one year.

SHIPPING SHARE MARKET.

[illegible] selling except in those quarters which are engaged in the doubtful patriotic work of disposing of vendor's shares in shipping companies of [illegible] consent having been granted by the Treasury to the issue of debentures, does such approval also carry with it sanction to the "marketing" of vendors' ordinary shares without making a direct issue to the public? The criticism directed in City circles against the methods upon which the [illegible] and is based not so much upon the refusal of the Treasury to give its sanction to new issues, but upon the looseness of its methods in granting approval by which such conditions may exist as that we have referred to.

In the shipbuilding section the principal matter of interest has been the issue of Palmers Shipbuilding & Iron Company's report and accounts, the first to be issued since the re-arrangement scheme was entered upon with the debenture holders. The accounts for the year to June 30 show a net profit of £103,822 compared with £65,096 for 1913-14, and £2,267 for 1912-13. The shareholders have, therefore, considerable reason for satisfaction. No direct advantage will, however, accrue to them for the present at least, as the company has been declared a controlled establishment under the Munitions of War Act as from July 12 last thus precluding the transfer of excess profits to the Government from that date, and no dividend may in any case be paid before the pref. and debenture holders are repaid. Shareholders have not received any dividend since 1907, but there were some transactions in the shares at about 5s. 3d. on the issue of the accounts.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING AND DOCKS.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
African S.S.	[illegible]	21½ 19[illegible]	7	7½	18–20	18 20
[illegible] Line .. Deb.	100	95 89	4	4	93¼ 95¼	94
[illegible] Line .. Cum pref.	10	10¾ 10	5½	5	10–10½	10⅜
Do. .. Def.	Stk.	98½ 98½	4½	4	104 106	102½
Argonaut Nav. .. Cum. pref.	1	29/6 25/	3	4½	1⅝ 1¾	[illegible]
Do. .. .. Def.	Bds.	104⅛ 100	6	6	98 100	91½
Australasian Un. S. Nav. Deb.	Stk.	84½ 81½	4	4¾	80 83	80–83
Bristol Steam. .. .. 'A'	1 5/pd.	5½ 4⅜	6	3	4⅜ 5⅛	5
British & African Nav. Deb.	Stk.	102 101	4½	4⅜	99½ 98½	99½
British India Nav. ... Deb.	Stk.	1[illegible]⅛ 98⅛	4½	4½	99½ 100	95
Bucknall SS. .. Cum. pref.	2	2⅛—1⅛	5⅝			
Cam. Line .. .. Def.	Bds.	102 94	5	5⅛	91–93	90⅜–91⅜
Clan Line .. .. Ord.	10	142—9	15	10⅝	10⅜—11	18½
Court Line ... . Ord.	£1		10	7½	--	1⅜
Cunard SS. .. .. Ord.	1	35/9 28	20	7	1⅜—1⅝	2½
Do. ... Cum. pref.	Stk.	103—97⅜	5	5	99 101	91½
Do. .. .. Def.	Stk.	102⅛ 98	4½	4½	101 103	96
[illegible] Line .. Def.	Stk.	103 100	4½	5	98—102	90
Elder Dempster .. Cum. pref.	1	1⅜ 1⅛	5½	5½	1⅛–1⅛	1⅛
Do. .. .. Def.	Stk.	105 99½	5	5⅛	102—104	90
Ellerman Lines .. Pref. Ord.	10	10⅜ 10⅞	6½	6	10—10⅜	9½
Do. .. Cum. pref.	10	10⅜—10⅞	4½	4⅝	10—10⅜	9⅝
France Fenwick .. Cum. pref.	5	97/6—92/6	5½	6½	4⅜—5	4⅝
Furness, Withy .. .. Ord.	1	34/3—25/6	10	7½	1⅛ -1⅜	1⅛
Do. .. Cum. pref.	10	9⅜ 9⅛	5	5½	9⅛—10	8⅛
General Steam Nav. Ord.	7½	6½ 5⅝	6	8	5⅝—5⅝	6½
Do. .. .. Pref.	8	7⅜ 7⅛	6	8	7⅛—7⅜	6⅞
Houlder Line .. Cum. pref.	5	85 —60	Nil	Nil.	2⅜—2⅜	3⅛
Do. .. .. Def.	Stk.	84⅜ 80	4½	5⅛	81—86	84⅜
Houlder Bros. ... Cum. pref.	5	4⅛ 3	5⅜	5⅛	4⅜—4⅞	4¼
Do. .. .. Def.	Stk.	85—78	4⅜	5⅛	81—86	82
India Gen. Nav. & Rly. ... Ord.	10	9⅜ 7⅛	8	9⅞	9–10	8⅜
Indo-China N. .. Pref Ord.	5	5⅛—87/6	6	6	3⅜—4⅜	6
Irrawaddy Flotilla	4/	125—114	15	5⅜	12[illegible]—12[illegible]	—
King Line .. .. Ord.	10	9½—8	8	7½	8⅜—9⅛	10½
La Guaira Harbour ... Deb.	Stk.	87—79	5	7⅛	78–80	66
Lamport & Holt ... Cum. pref.	£1	1[illegible]—[illegible]	6	6	1⅜—1⅜	[illegible]
Leyland (F.) .. Cum. pref.	10	11—9[illegible]	10	13⅜	7⅞—8¼	7⅞
Do. .. .. Deb.	100	99⅜—95⅜	4	4	99–101	[illegible]
Mercantile SS. ... .. Ord.	5	8⅞—6⅜	17½	10⅜	6–6⅜	8½
Do. .. .. Pref.	1	18[illegible] 16.8	5	5⅛	⅜—1	1⅝
Moor Line .. .. Ord.	10	14—11[illegible]	15	—	—	—
[illegible] Steam. Nav. ... Deb.	100	103⅜—99	5	5⅛	99⅜–101⅜	97½
New Zealand ... .. Ord.	£10	20⅝—10⅜	8	4⅛	14⅜ 15⅛	15[illegible]
Do. .. .. Deb.	Stk.	95—92½	4	4⅛	92—94	93⅛
Nitrate Producers SS. ... Ord.	5	8⅜—8	17½	9⅜	8—8⅜	12⅛
Do. .. Cum. pref.	5	5—97/6	5	5	4⅜—5	4⅝—5
Oceanic Steam. Nav. ... Deb.	100	100—96½	4½	4⅝	97—99	97½
Orient.Stm.Nav.Co. Cum. pref.	10	10⅛—9⅜	5	5⅛	9⅜—10	9[illegible]
Do. .. .. Deb.	100	99 94⅜	4½	4⅝	98—100	96
P. & O. S. N. ... Cum pref.	100	125⅝—107	5	5⅛	109—112	96½
Do. .. .. Def.	100	350—270	18	5⅛	270—290	295
Do. .. .. Deb.	Stk.	91 87	3⅝	5	84–86	77½
Prince Line	1	25/3—20/	5	2⅛	1 1⅛	2⅛
R.M.S.P. ... .. Ord.	100	143—100	Nil.	Nil.	82–87	81
Do. .. .. Pref.	Stk.	100⅛ 98	5	5⅛	98 101	88½
Do. .. .. Deb.	Stk.	104⅛ 100	4½	4⅜	101—103	87½
Shaw, Savill & Alb. Cum. pref.	5	5⅛—96/6	5	5⅛	4⅜—5	4⅝
Shell Transport .. .. Ord.	1	7⅜—96 10/	30	5⅛	4–4⅛	4⅞
Do. .. Cum pref.	10	11⅞ 10	5	5⅛	10⅜—10⅝	9⅝
Sutherland SS. Co.	£1	1⅛ 1	25	15⅝	1—1⅛	1⅛
Union-Castle SS. Cum. pref.	10	10 9⅝	4½	5	8⅝–9⅛	7⅝
Do. .. .. Deb.	Stk	9[illegible] 92	4	4⅜	93–95	93
West Hartlepool ... ... Pref.	1[illegible]	4⅛—3⅝	[illegible]	9⅛	2⅝—3⅝	5⅛

INSURANCE.

Alliance	20 (2·4 pd.)	12⅝—11[illegible]	12 -	6½	11⅝—12⅜	8⅝
Do. (new shares)	1	1⅛ 1⅛	12/-	5⅛	1⅛—1⅛	1⅛
Indem. Mutual Marine	15 (3 pd.)	1⅝ 1⅝	1⅝	6	10—11	9⅝
[illegible] Assurance	25 (12½ pd.)	4 4⅛	2⅜	6	5⅛—6	4⅝
Marine Insurance	25 (15 pd.)	3⅝ 3⅜	4⅜	6½	38⅜—39	35⅝
Mercantile Insurance	10 (2 pd.)	5⅝ 4⅜	12½	5	8⅛—9⅛	7⅝
Merchants' Marine Insurance ...	10 (2½ pd.)	66 3—61/3	7½	5	4⅛—4⅜	4⅛
N. Boiler & Marine Ins. Co.	25 (6½ pd.)	4[illegible]	40/-	6	4[illegible]—4⅛	4⅛
Do. Pref.	Stk.	[illegible]	4	5½	98—100	77½
Patent Automatic Accident ..	10 (1 pd.)	1⅜ 1	40	6	7⅛—7⅜	7⅛
Royal Exchange Marine ..	10 (2 pd.)	7 6	17	5	7⅛—7⅝	7
Royal Exchange Assurance ..	Stk.	2[illegible] [illegible]	10	5	213—218	196½
Sea Insurance	10 (2 pd.)	20—17⅛	8	4	20—21	[illegible]
Wiltshire Mutual Limited ..	5 (2 pd.)	3[illegible] 2[illegible]	8	5⅛	1⅛—1⅛	1⅛

* Wiltshire shares. † Includes 2½% bonus.

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. ½ or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
Babcock & Wilcox... ... Ord.	1	69 4⅛-56/3	16	5⅜	2⅜ 2⅜	2⅛
Baldwins ... Cum. pref.	1	22/6—21/3	5⅜	5⅛	1⅛-1⅜	1⅜
Do. ... .. Deb.	Stk.	100¼—100¾	4⅜	4⅜	97—99	98
Bayliss, Jones ... Cum. pref.	1		5	7½	⅛—⅜	⅛—⅛
Bell Bros. ... ... Cum. pref.	10	12⅛—11	6	5⅛	11⅝ -12⅛	10⅛
Do. ... ... Deb.	Stk.	98 96⅜	4	4⅛	96—98	96–98
Bessemer (Henry) ... Ord.	1	1⅛ 1⅛	10	8⅜	1⅛—1⅛	1⅛–1⅛
Bolckow Vaughan ... Ord.	1	22/6-19/4⅜	6	6½	1⅛—1⅛	1⅛
Do. ... ... Cum. pref.	20	21⅛—20/-	5	5⅜	20–21	19⅛
Cargo Fleet Iron ... Ord.	1	11/10⅛—7/6	2⅜	5	⅛—⅛	⅜
Do. ... ... Deb.	100	91—85⅜	4½	5⅛	89–92	87
Consett Iron Co. ... ... Ord.	1	88/6—74/6	30	10⅜	3⅛—3⅜	2⅛
Dominion Iron & Steel	Bds.	100⅜—88⅜	5	6⅛	83—87	75
Dorman, Long ... ... Ord.	1	21/6—16/9	7⅜	8⅛	1⅞—1⅝	1⅜
Do. ... ... Deb.	Stk.	88⅛—85⅜	4	4⅝	87—90	84⅛
Ebbw Vale Steel & Iron Ord.	1	18/—16/-	10	11⅛	3⅛—3⅞	3⅛
Guest, Keen & Nettefids Ord.	1	68/9—61/3	15	4⅜	3⅝—3⅞	3⅝
Do. ... ...Cum. pref.	5	5⅜—5⅝	5	4⅜	5⅝—5⅝	5⅜
Do. ... ... Deb.	Stk.	100⅛—95⅝	4	4⅛	96—98	83⅛
Hadfield's Steel Foundry Ord.	1	63/—58/9	22½	6⅜	3—3⅛	3⅞
Hawthorn (R. & W.) Leslie Ord.	10	13—12	10	7½	13⅜—13⅝	13⅛–13⅝xd
Ibbotson Bros. ... ... 5 (4 pd.)		7—5⅜	10	7½	6 6⅜	6—6⅜
Jessop (W.) & Sons ... Ord. 5 (4 pd.)		6⅜—6⅜	15	11⅜	6⅜—6⅝	6⅜
Lanarkshire Steel Cum. pref.	10	7⅜ 6⅜	5	6⅜	5⅜ 6⅜	6
Lysaght (J.) ... Cum. pref.	1	27/6—25/-	6	5	1⅛ -1⅜	1⅛
Do. ... ... Deb.	Stk.	108⅜—102⅜	4½		104—106	--
Manganese Bronze ... Ord.	1	⅜—⅜	6	11	⅜ ⅜	⅜
Do. ... ... Cum. pref.	1	1—⅝	6	6⅛	⅜ 1	⅜
North-Eastern Steel ... Deb.	Stk.	89—92	4⅜	—	—	—
Palmers Ship & Iron "A"	1	[illegible]	Nil.	Nil.	[illegible]	[illegible]
Scott (Walter) ... ... Ord.	1	16/—14/6	5	6⅛	[illegible]	[illegible]
Do. ... ... Deb.	Stk.	86—82	4	4⅝	81—82	89 –91
Sheffield Forge ... ... Ord.	1	1⅝ 1⅜	12½	7	1⅛ 1⅜	1⅜
Shelton Iron & Steel ... Deb.	100	99⅜—90	5	5⅜	93—98xd	94⅜
S. Durham Steel & Iron Ord.	1	35/—23/6	10	6⅜	1⅜ 1⅛	1⅛
Do ... ... Cum. pref.	1	20/6—19/-	8	5⅛	3⅛—1⅜	1⅜
Do. ... ... Deb.	Stk.	95—98	4⅜	4⅜	90–92	90–92
Steel Co. of Scotland ... Ord.	10	12⅜—8⅜	5	5⅜	8⅜ 9	8⅞ 9⅛
Stewarts & Lloyds Pref. ord.	10	21⅛—20	10	5⅛	20—21	19⅜
Do. ... ... Cum. pref.	10	14⅜—13⅛	6	4⅜	11⅛ 13⅞	13⅛
Stone (J.) ... ... Cum. pref.	10	9⅜—9	5	5⅛	8⅜—9⅛xd	9⅛
United States Steel ... Ord.	100$	71⅛—50	3	3⅜	61—61⅜	57
Do. ... ... Cum. pref.	100$	113⅜—104⅜	7	6⅜	112—113	121⅜
Vickers Ltd. ... ... Ord.	1	43/6—33/3	12⅜	7⅛	1⅛—1⅛	1⅛
Do. ... ...Pref.	Stk.	106¼—99	5	5	104—107	100
Do. ... ... Deb.	Stk.	100⅜—91⅛	4	4⅜	96⅜—98⅜	82⅛
Weardale Steel ... Def. ord.	1	21/—17/-	6	7⅜	⅜—⅝	⅜
Do. ... ... Cum. pref.	1	20 1⅜-18/-	6	6⅜	1⅜—1	1⅛
Do. ... ... Deb.	Stk.	77—73½	4	5	77—80	77 –
Workington Iron & Steel Ord.	1	16/6—12,3	6	8½	[illegible]	[illegible]

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	50 — 39/	12½	6	1[illegible] 2⅜	1⅛
Do. ... ... Cum. pref.	5	95 —84/6	4	5⅛	4⅛ -4⅜	3⅝
Do. ... ... Deb.	Stk.	98⅛—94⅜	5	6⅛	96—98	79⅜
Beardmore (W.) ... ... Ord.	100	96¼—91½	4⅜	5⅛	94—96	89
Brown (John) ... ... Ord.	1 (15s. pd.)	23 — 17/9	12½	9⅜	3⅜—3⅝xd	1
Do. ... ... Cum. pref.	10	10⅛—9⅛	5	5⅛	9⅛—10xd	8⅝
Cammell Laird ... ... Ord.	5	3⅜ -22	7½	7⅜	3⅜—4⅛	3⅜
Do. ... ... Cum. pref.	5	92/6—79/-	5	6⅛	4⅛–4⅜	3⅞
Do. ... ... Deb.	100	90⅜—84⅛	4⅜	5	92—94	90
Dunlop (Jas.) ... ... Ord.	1	18.6—17/6	Nil.	—	⅛—⅜	⅛
Do. ... ... Cum. pref.	1	1⅛ ⅜	6	7⅜	⅜ 1	⅜
Fairfield Shipbldg Cum. pref.	10	10—7⅛	8	8⅜	--	7⅜
Fleming & Ferguson ... Ord.	10	20⅛—12⅜	10	8⅛	14⅛—14⅜	14⅛
Gray (Wm.) ... ... Deb.	100	100⅜—100	4⅜	4⅜	100-102	100
Henderson (D. & W.) Cum. pref.	1	⅜—⅛	5	12	⅛—⅛	⅛
Richardsons Westgarth Ord.	1	3/6—1/9	Nil.	Nil.	⅛ ⅜	⅛
Do. ... ... Cum. pref.	1	9/9 -4/3	Nil.	Nil.	⅛ ⅜	⅛
Do. ... ... Deb.	Stk.	70—58	4⅜	6⅛	55–58	69⅛
Simons (W.) ... Cum. pref.	10	10⅛—10	5	4⅞	10⅛—10⅜	10⅛
Stephenson (R.) ... ... Ord.	1	66⅝—53	Nil.	Nil.	—	
Do. ... ... Deb.	Stk.	66¼ 63	Nil.	Nil.	—	
Swan, Hunter & W. R. ... Ord.	1	19.10⅜-16 -	†1	10⅜	1⅛—1	1⅛
Do. ... ... Cum. pref.	1	19/9—17/9	5	7⅛	1⅛—1	1⅛
Do. ... ... Deb.	Stk.	90⅛—88	1¼	1⅜	90–93	90–93
Thornycroft (John I.) ... Ord.	1	27/6—12/6	8	8⅛	⅝ ⅝	⅝
Do. ... ... Cum. pref	1	19 3—11/3	6	7⅛	⅝ ⅝	⅝
Do. ... ... Deb.	100	94—91	5	5⅜	88—92	93
Wallsend Slipway ... Ord.	1	1⅜ 1⅛	10		1⅛—1⅜	—
Do. ... ... Cum. pref.	1	20 —20/-	5	—	1⅝—1⅞	—

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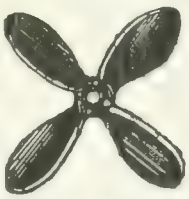

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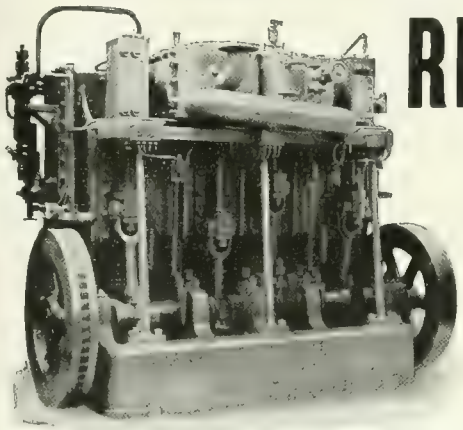

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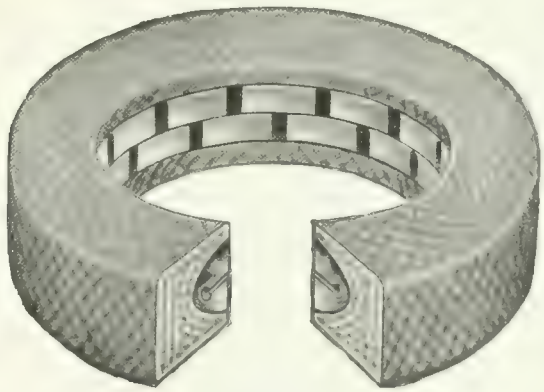

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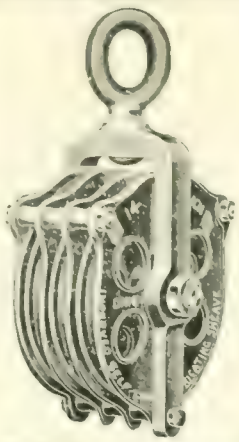

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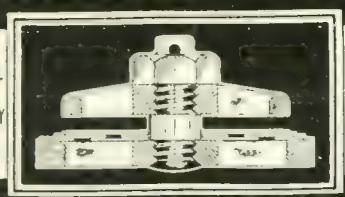

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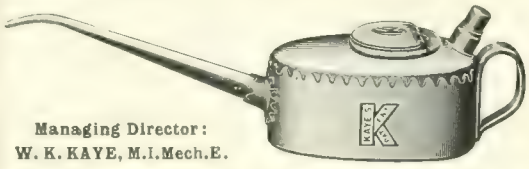

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AERIAL ROPEWAYS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
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Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
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Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.
ALUMINIUM GOODS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
ANCHORS— [Sunderland.
Byers, W. L., & Co., Ltd., Tavistock House,
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs. [on-Tyne.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.
ANTI-CORROSIVE COMPOSITIONS—
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Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett & Co., Ltd., St. Nicholas Chambers, Newcastle on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.
ANTI-FOULING COMPOSITION—
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Websters Ltd., Hull.
ANTI-FRICTION METALS—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
ARMOUR PLATES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
ASBESTOS GOODS—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.
ASH BAGS—
Speedings Ltd., Sail Works, Sunderland.
ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.
ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.
AWNINGS—
Speedings Ltd., Sail Works, Sunderland.
BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
BARROWS (Cargo)—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
BEDDING & NAPERY— [Glasgow.
Stewart, Archibald & Co., 40-48, Union Street,
BEMAL CONDENSER TUBES—
Yorkshire Copper Works, Ltd., Leeds.
"BITUMASTIC" ENAMEL MANUFACTURERS—
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
BLINDS—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.
BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.
BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., East Cowes, I.W.
BOILER CIRCULATORS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
BOILER CLEANER—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
BOILER COMPOSITION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish
BOILER COVERING— Town, N.W.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston,
BOILER MOUNTINGS— Glasgow.
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
BOILER PLATES (Steel)—
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.
BOILER TUBES—
Yorkshire Copper Works, Ltd., Leeds.
BOLTS AND NUTS—
Coventry Chain Co., Ltd., Coventry.
BORING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
BRASS & COPPER RODS—
Delta Metal Co., Delta Works, East Greenwich,
BRASS FOUNDERS— London, S.E.
Billington & Newton, Ltd, Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.
BRASS NAME-PLATES—
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.
BRASS TUBES—
Yorkshire Copper Works, Ltd., Leeds.
BRASSWORK—
Laycock, W. S., Ltd., Victoria Works, Millhouses,
BRONZE (Manganese)— Sheffield.
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ld., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.
BRIGHT STEEL—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.
BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.
BULKHEADS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
BUNTING—
Riley, Edward, & Co., Leeds.
BUOYANT DECK SEATS— [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works,
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.
BUOYS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley & Sons, Ltd., Netherton Iron Works,
CABINET MAKERS— Dudley, Staffs.
Stewart, Archibald & Co., 40-48, Union Street,
CABLES (Chains)— Glasgow.
Byers, W. L., & Co., Ltd., Tavistock House, Sunderland.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.
CAISSONS & DOCK GATES—
Swan, Hunter, & Wigham Richardson, Ltd.,
CALORIFIERS— Wallsend-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
CAPSTANS (Electric)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh.
Stothert & Pitt, Ltd., Bath.
CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.
CARPETS—
Stewart, Archibald & Co., 40-48, Union St., Glasgow.
CASE HARDENING BOXES—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham
CASE HARDENING COMPOSITION—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham
CASE HARDENING OIL—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham
CAST BRASS PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.
CASTINGS (Steel)—
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyd's, Ltd., 41, Oswald St., Glasgow.
CASTINGS (Steel, Iron and Brass)—
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
CEMENT—
Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff.
CHAINS—
"Coventry" Chain Co., Ltd., Spon End Works, Coventry.
COAL—
Beynon, T., & Co., Ltd., Merthyr House, Cardiff.
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.
Fernhill Collieries, Ltd., Merthyr House, Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.
Rhymney Iron Co., Ltd., Merthyr House, Docks,
COMPASSES (Ship)— Cardiff.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
CONDENSERS—
Bellis & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
CONDENSER TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.
CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
CONVEYORS—
Mather & Platt, Ltd., Manchester.
COOKING APPARATUS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.
COPPER PIPES—
Yorkshire Copper Works, Ltd., Leeds.
COPPERSMITHS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
COPPER TUBES—
Yorkshire Copper Works, Ltd., Leeds.
CORK INSULATION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Newcastle-on-Tyne.
Newalls Insulation Co., 31, Mosley Street,
CORRUGATED IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
COUNTER (Engine)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
CRAB WINCHES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
CRANES—
Ransomes & Rapier, Ltd., 32, Victoria St., S.W.
Stothert & Pitt, Ltd., Bath.
CYLINDERS (Copper)—
Yorkshire Copper Works, Ltd., Leeds.
DELTA METAL—
Delta Metal Co., Delta Works, East Greenwich, S.E.
DERRICKS & DAVITS—
Howden, James, & Co., Ltd., 95, Scotland Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
DISTILLING APPARATUS—
Royles Ltd., Irlam, Nr. Manchester.
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Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.
DOCK & SHIP LIGHTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.
DOCK GATES—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
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Stone, J., & Co., Ltd., Deptford, S.E.

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DREDGING—
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DRILLING MACHINES
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DRILLS—
[illegible]

DRILLS (Pneumatic and Electric)—
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DRY FITTINGS (Laundry)—
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DYNAMOS—
[illegible]
Holmes, J. H., & Co., Portland Road, Newcastle-Tyne.

ELECTRIC CRANES—
[illegible]
Mather & Platt, Ltd., Manchester. [on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC DERRICKS—
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ELECTRIC DYNAMOS & MOTORS—
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British Thomson-Houston Co., Ltd., Rugby.
[illegible]
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC FITTINGS—
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ELECTRIC HEATING & COOKING APPARATUS—
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ELECTRIC LAMPS—
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ELECTRIC LIGHTING—
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British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC-LIGHTING PLANT—
British Thomson-Houston Co., Ltd., Rugby.
[illegible]
Trafford Park, Manchester.
[illegible]
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
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Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC WIRES—
[illegible]

ELECTRICAL CONTRACTORS—
[illegible]
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Glasgow.
[illegible]
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL ENGINEERS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
[illegible]
Road, Bootle, Lancs.
[illegible]
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. [on-Tyne.
[illegible]
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL INSTRUMENTS (Ammeters)—
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British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

ELECTRICAL INSTRUMENTS (Circuit Breakers)—
[illegible]
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A. & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

EMERY WHEELS—
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ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE (Electric Light)—
Belliss & Morcom, Ltd., Birmingham.
Greenwood & Batley, Ltd., Albion Works, Leeds.

ENGINES (Land)—
Chambers, John, Ltd., Lowestoft.

ENGINES (Marine)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

ENGINE & DECK STORES—
McGeoch, Wm. & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

ENGINE AUXILIARIES—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

ENGINE FITTINGS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobbie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.
Newalls Insulation Co., 31, Mosley Street,

ENGRAVERS— Newcastle-on-Tyne.
Brown, Robert, & Co., 12, Espedair St., Paisley.

EVAPORATORS—
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E. Greenwich, London, S.E.

FANS—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg., Co., Ltd., Trafford Park, Manchester. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FEED-WATER HEATERS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FILES—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns, Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Sheffield.

FLAGS—
Riley, Edward, & Co., Leeds.
Speedings, Ltd., Sail Works, Sunderland.

FLOATING DOCKS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow. [Scotland.
Hamilton, Wm., & Co., Ltd., Port Glasgow,
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Howden, J., & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

FORGINGS—
Brown, John & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Hingley & Sons, Ltd., Netherton Iron Works, Staffs.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

FUSES—
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

GALLEY GEAR—
Grieve, T., & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

GAUGES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

GEARING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

HATCH COVERS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd, 43, Lower Mosley Street, Manchester.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

HIGH SPEED DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Brown, John, & Co., Atlas Works, Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Stothert & Pitt, Ltd., Bath.
Waygood-Otis, Ltd., Falmouth Road, S.E.

BUYERS' GUIDE—*continued.*

HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

HYDRAULIC CRANES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HYDRAULIC MACHINERY—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

INDIARUBBER—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London S.E.

INDICATORS—
Robinson, A., & Co., Ltd., Bootle, Liverpool.

INDUCED DRAUGHT—
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

LAUNCHES—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—
Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—
Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

LIFTS AND HOISTS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

LIGHTERAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LIMEWASHING & DISINFECTING MACHINES—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—
Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS— [Cranstonhill, Glasgow.
McRobie, John, & Sons, 94, Elliott Street,

MACHINE TOOLS—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—
Bailey, C. H., Newport, Mon. Barry Docks.
Barry Graving Dock & Engineering Co., Ltd., Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS *(contd).*—
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Richardsons, Westgarth & Co., Ltd., Hartlepool, Middlesbrough and Sunderland.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd, East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

MARKING-OFF TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

METAL SPINNINGS—
Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East Greenwich.

MOTOR BOATS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR— [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

OIL CANS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

PACKING (Engine)—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas., & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

PAINTS—
Briggs, W., & Sons, Ltd., Dundee.
Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft. [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Billington & Newton, Ltd., Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Central Marine Engine Works, West Hartlepool.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING MACHINES—
Scriven & Co., Leeds Old Foundry, Leeds.

RADIATORS—
British Thomson-Houston, Co., Ltd., Rugby.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—
Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd, Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Ironworks, Glasgow.

RESCUE APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

REVERSING ENGINES (Direct-Acting Type)— [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A. & Co., Ltd., Hebburn-on-Tyne.

ROPE-CUTTING MACHINES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROPES (Wire)—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFE MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford Street, Birmingham.

SALOON LIGHTS—
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

SALVAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

SANITARY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

SCREWING MACHINES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

SHAFTING—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

SHAPING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

SHEAVES—
Higginson & Co., 7, Hurst Street, Liverpool.

SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHIP APPLIANCES—
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

SHIP BROKERS (Sale and Purchase)—
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

BUYERS' GUIDE—*continued.*

SHIPBUILDERS—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman, Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

SHIP CONSTRUCTION—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., and Maxwell Pallard, Wallsend Shipyard, Wallsend-on-Tyne.

SHIP FURNISHINGS & FITTINGS—
Cocks, Harry, & Co., Cardiff.
Davey & Co (London), Ltd., 88, West India Dock Road, E.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Street, North Shields.
Liddiard's Patent Ship Fittings Co., Hudson
Loveridge, Ltd., Cardiff.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street.
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waygood-Otis, Ltd., Falmouth Road, S.E.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

SHIP PLATES (Steel)—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

SHIP REPAIRERS—
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers, & Co., Ltd., Northam Ironworks,
Dickinson, Hess, & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & S., Ltd., Royal Liver Building, Harland & Wolff, Ltd., Belfast. Liverpool.
Harris Bros., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Manchester Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' ELECTRIC FITTINGS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sutherland Forge & Engineering Co., Ltd., Sunderland.

SHIPS' LAUNDRIES—
Trafford, T., & Co., Salford, Manchester.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

SIGNAL, FLASHING AND CABIN LAMPS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

SILICATE-COTTON SPECIALITIES— [Glasgow.
Walker, Jas., & Co., 11, Bishop Court, Anderston,

SKYLIGHT & LIFTING GEARS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

SLAG WOOL (Silicate Cotton)—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

SLEWING GEAR (for Ships' Derricks)—
Edina Manufacturing Co., 19h, Broad Wynd,

SMITHS' HEARTHS— Leith.
Keith, James, & Blackman Co., Ltd., 27, Farring-

SOLDER— don Avenue, London, E.C.
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPEAKING TUBES—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Steene, L., & Co., Ltd., Crown Iron Works, Glasgow.

SPONGES
Phillips, John, & Sons, Ltd., Dudley Road, City Road, London, E.C.

STAMPINGS—
Deeta Metal Co., Ltd., East Greenwich.

STAYBOLTS—
Brierley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

STEAM-FITTING MANUFACTURERS—
Bellington & Newton, Ltd., Longport, Staffs.
Royles Ltd., Irlam, Nr. Manchester.

STEAM-HEATING—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM KETTLES—
Royles Ltd., Irlam, Nr. Manchester.

STEAM PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

STEAM TRAPS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAMSHIP SPECIALITIES—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water House,

STEEL—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Seamless Steel Boat Co., Ltd., Wakefield.

STEEL MAKERS—
Brown, John, & Co., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

STEERING-GEAR—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

STEERING GEAR (Buffers)—
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh.

STOCKS AND DIES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

STORES (Ship)—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

STRONG ROOM MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRONG ROOM DOOR MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRUCTURAL ENGINEERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W.

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWITCHBOARDS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Eng'r'ing Co., Ld., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

SYRENS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

TANK TOP COVERING—
Hamilton, Archd., & Co., Possilpark, Glasgow.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

TARPAULINS—
Speedings Ltd., Sail Works, Sunderland.

TELEPHONES—
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

TOOL STEEL—
Brown, John, & Co., Atlas Works, Sheffield.

TOWAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

TUBES—
Royles Ltd., Irlam, Nr. Manchester.
Staffordshire Tube Co., Ltd., Birmingham.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

TUBES & FITTINGS (Wrought Iron)
Staffordshire Tube Co., Ltd., Birmingham.

TURBINE OIL—
Rimer Bros., Newcastle-on-Tyne.

TURBINES (Auxiliary)—
Bulliss & Metcalfe, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
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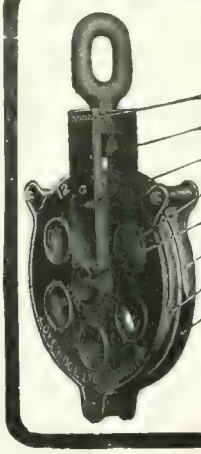

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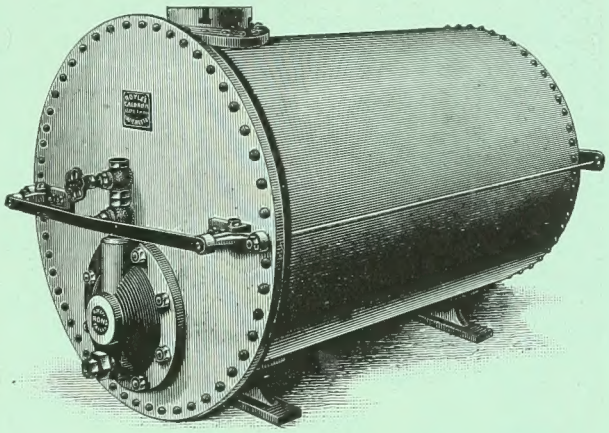

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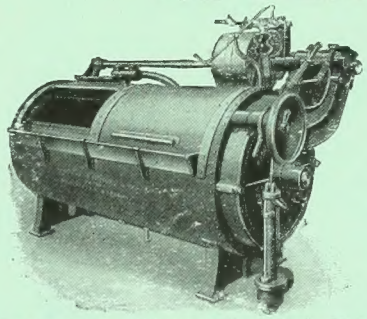

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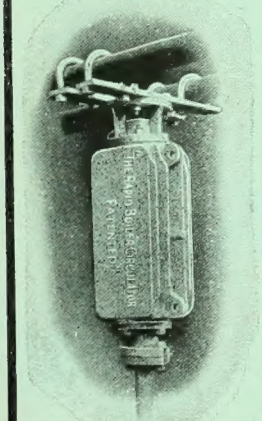

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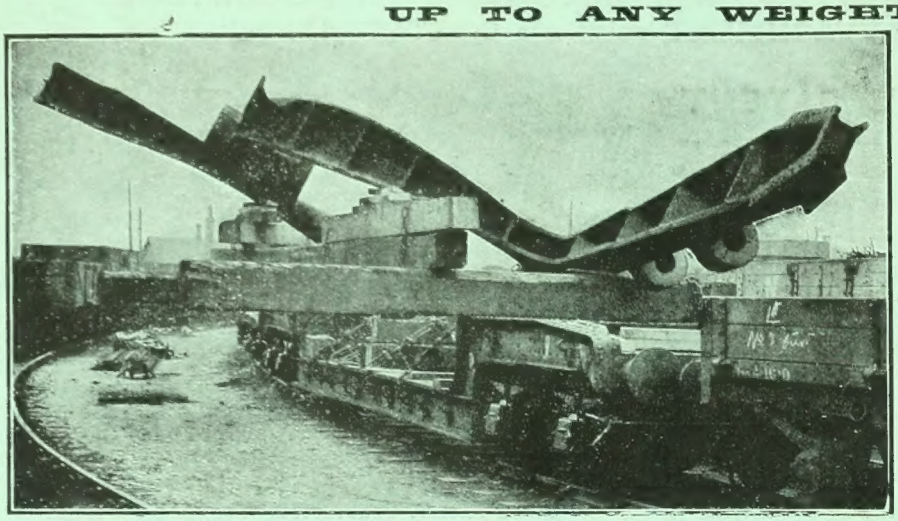

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